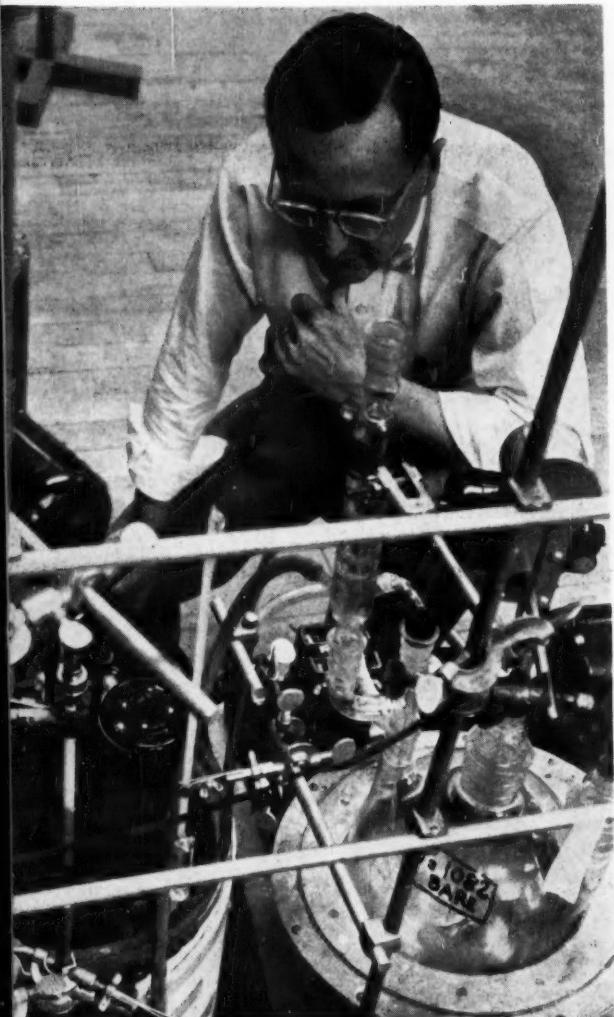


Chemical Week



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June 20, 1959

STEVENS RICE
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The Toss Test

Flip a handful of Westvaco Soda Ash downwind. No rising cloud here! Do the same with any ordinary soda ash. See the difference?



**this is all the equipment
you need to prove**

Westvaco® Soda Ash

dusts less . . . flows more freely!

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Let the roller-shaped crystals of Westvaco Soda Ash pour from your palm.

Try another soda ash. Note how much faster and more smoothly Westvaco Soda Ash flows.



You can readily see the difference in physical characteristics that makes Westvaco Soda Ash unique —faster and cleaner to unload and to handle.

Simple comparative dissolution tests show it's quicker to dissolve . . . and to produce solutions with crystal clarity. Chemical analyses tell you it's purer, too . . . low in iron, salts, heavy metals and insolubles . . . and entirely ammonia-free!

Only a plant trial, however, can prove how Westvaco Soda Ash can simplify and speed up your processing and better your end-products.

If you want to make a few pre-trial tests, we'll gladly supply samples. But be sure to schedule practical in-use tests, too, and see what Westvaco Soda Ash can do for you. Why not place a trial order now?



Putting Ideas to Work

**FOOD MACHINERY AND CHEMICAL CORPORATION
Westvaco Chlor-Alkali Division**

General Sales Offices:
161 E. 42nd STREET, NEW YORK 17



Photo courtesy Globe Rubber Products Corporation, Philadelphia, Pa.

Fashion floor that's built for kicks

Spiked heels may be stylish on the foot, but they're "murder" on floors. Car floors, particularly, take a beating—not only from the pointed fashions of modern footwear, but from the constant pounding of foot-loose youngsters.

To take it, car floor covers or mats must be tough. And to sell, they must have color. One of the leading manufacturers in this field has found that PLIOFLEX, synthetic rubber by Goodyear, has the lasting qualities they require. It has also enabled them to make a more sales-appealing product at a substantial saving.

Want proof? One look at a mat such as the one above will do it. Consider, too, the assured processability of PLIOFLEX plus its high uniformity and exceptional resistance to aging.

It all adds up to economical production of a sales-appealing product. To add appeal to your product without adding to your costs, check the advantages of PLIOFLEX. For full information—plus latest *Tech Book Bulletins* on PLIOFLEX and a full range of synthetic rubbers and rubber chemicals—write Goodyear, Chemical Division, Dept. F-9417, Akron 16, Ohio.



GOOD  **YEAR**
CHEMICAL DIVISION

Plioflex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

POLYETHYLENE? YOU CAN MAKE IT BETTER WITH GULF ETHYLENE

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Highest quality ethylene . . . dependability of supply, assured by two Gulf plants plus underground storage facilities . . . unequalled experience in ethylene production . . . and the convenience of pipeline delivery . . . these are just some of the reasons why Gulf ethylene can be the beginning of a better end product for you. Write us for details and a map of the area served. Petrochemicals Department, Gulf Oil Corporation, Gulf Building, Pittsburgh 30, Penna.

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Quality Chemicals
from Petroleum



Chemical Week

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 - Pegging the petrochemical outlook. Plenty of forecasts, plenty of
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needed—*

AEROSOL[®]

Emulsion polymerization folks are cheering Cyanamid these days. A unique surfactant which produces especially stable polymers is the cause of their joy. Technically dubbed tetrasodium-N-(1,2-dicarboxyethyl)-N-octadecylsulfosuccinate, Cyanamid mercifully markets it as AEROSOL 22.

AEROSOL 22 is effective in the polymerization of styrene and styrene-ethyl acrylate copoly-

mers. It should also find use in the polymerization of ethyl acrylate, butyl acrylate, and other acrylic esters and vinyl monomers.

Other applications are numerous and varied—in emulsifying wax and oil emulsions—in demulsifying water-in-oil emulsions—deflocculation of certain pigments—dispersing in aqueous systems. But let's not go into too many details over one surfactant. Cyanamid offers such a wide variety.

CYANAMID

AMERICAN CYANAMID COMPANY

PROCESS CHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N.Y.

Chemical Week • June 20, 1959

22 Surfactant

OTHER AVAILABLE GRADES OF AEROSOL SURFACTANTS

AEROSOL® OT. One of the most powerful wetting agents and surface tension depressants available commercially. Widely used by the textile, rubber, petroleum, paper, metal, paint, plastics and agricultural industries. In three forms—AEROSOL OT, 100% waxy solid—AEROSOL OT, 75% active solution—AEROSOL OT-B, 85% active powder.

AEROSOL® MA. An 80% active solution. Used chiefly in emulsion polymerization and as a wetting agent in dilute solutions of salts.

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NEW AEROSOL® TR. A homologue of the product sold as AEROSOL OT with a very high oil solubility. Particularly effective for oil-in-water emulsions and in emulsion polymerization.

Many problems can best be handled by using a combination of AEROSOL surfactants. If you need the help of a Cyanamid man in finding the right combination for your problem, don't hesitate to contact us. And, by the way, for 3 free technical booklets—AEROSOL 22 SURFACE ACTIVE AGENT, AEROSOL TR SURFACE ACTIVE AGENT and AEROSOL 22 SURFACE ACTIVE AGENT—simply mail coupon today.



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AERO® HCN (Liquid Hydrocyanic Acid)	Mineral Acids
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VINYL ANTI-FOULING PAINT... BENTONE 27 gellant prevents hard settling.



FLAT LACQUER... BENTONE 27 gellant suppresses caking of flattening pigment.

BENTONE® 27...new National Lead gellant... “difficult” industrial coatings on their

... provides a new high in efficient gelling of polar paints and compounds

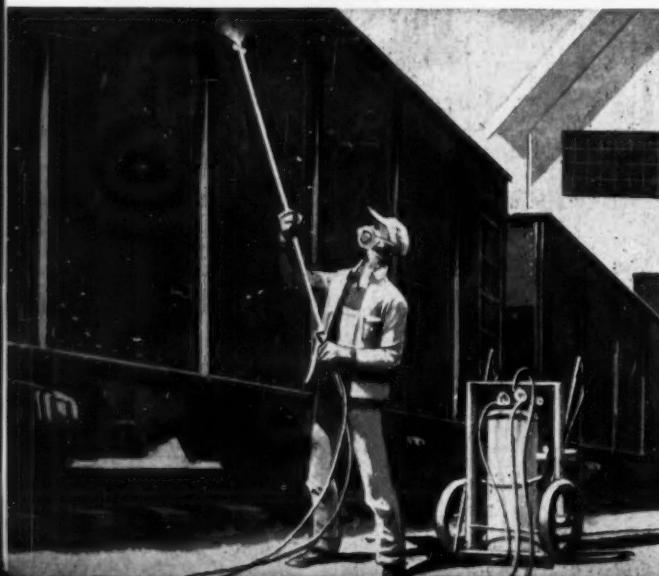
All these industrial coatings are star performers in specialized fields.

Yet each suffers from two kinds of trouble... poor flow characteristics, and hard settling of pigments. Up to now, there's been no dependable way to correct these faults, without adversely affecting performance.

Now comes word of a new thixotropic gelling agent... BENTONE 27... which overcomes these difficulties. BENTONE 27 gellant was specially developed by National Lead Company to give unique control over flow properties in medium to high-polarity systems.

Just note what this interesting new gellant does for the “difficult” coatings illustrated. In vinyl and anti-fouling paints it prevents hard settling of heavy oxide pigments.

ONE-COAT MAINTENANCE PAINT... BENTONE 27 gellant helps provide a uniform, heavy coat.



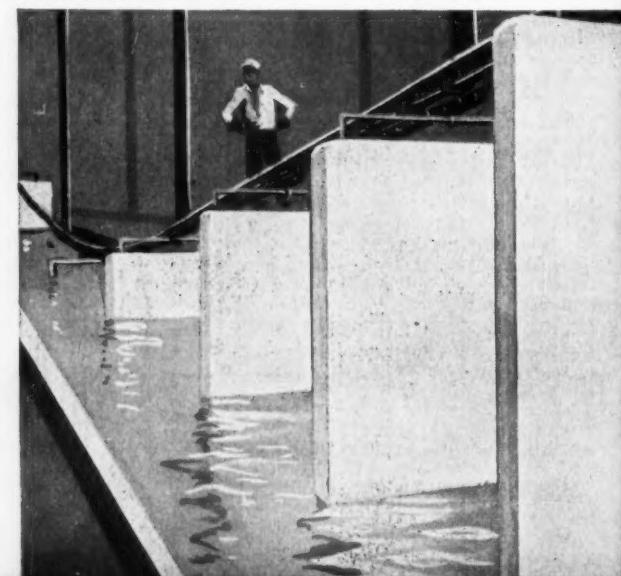
In vinyl baking primers it takes care of the familiar problem of sag during high temperature curing. In epoxy resin enamel dip coatings it gives greater uniformity of film thickness, more thickness control, than ever before achieved.

BENTONE 27 gellant is by no means restricted to polar system application. It is also highly effective in conventional alkyd and oleoresinous finishes, using the incorporation techniques detailed in our BENTONE 27 brochure. It will thicken solvents ranging from odorless mineral spirits to methyl isobutyl ketone. (Box at right gives examples.)

So it goes in all types of organic finishes, coatings and resin compounds. Film integrity increased. Water resistance stepped up. Color uniformity aided. Property after property improved.

We'll mail a fact-filled BENTONE 27 gellant brochure to you as soon as we receive the coupon below, right.

EPOXY RESIN ENAMEL... BENTONE 27 gellant boosts control over runoff, film thickness.





ALKYD MELAMINE BAKING ENAMEL . . . BENTONE 27 gellant provides uniform film thickness in dipping and baking.

puts these and other best behavior

TYPICAL BENTONE 27 GELS IN SOLVENTS

4% BENTONE 27 gellant by weight gave the following Brookfield viscosities

	10 RPM	20 RPM	50 RPM	100 RPM
Odorless mineral spirits	10,400 cps	3700 cps	1040 cps	440 cps
Toluene	14,400 "	5200 "	1600 "	600 "
Ethyl acetate	2700 "	1350 "	560 "	300 "
Methyl isobutyl ketone	3000 "	1200 "	360 "	180 "
Lacquer solvent system*	6000 "	2800 "	1360 "	760 "

BENTONE 27 gellant predampened with 1/2 its weight of 95% methyl alcohol-5% water. Gels prepared in a Waring Blender.

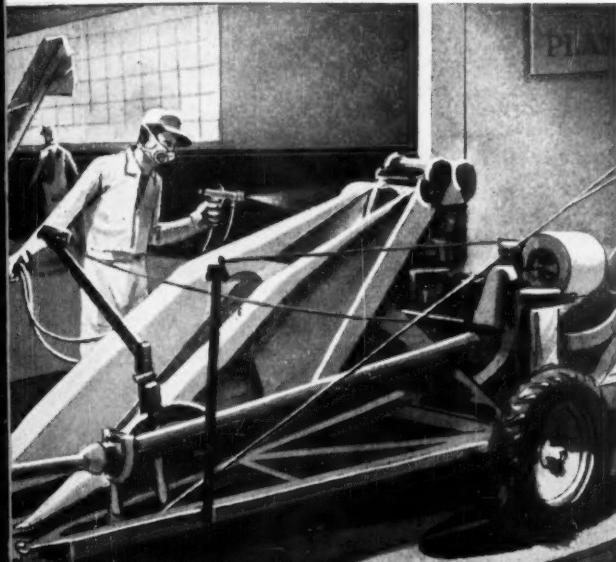
*MIBK 90 parts Toluene 180 parts
Ethyl alcohol 30 parts BENTONE 27 gellant 12.5 parts

A Chemical Development of

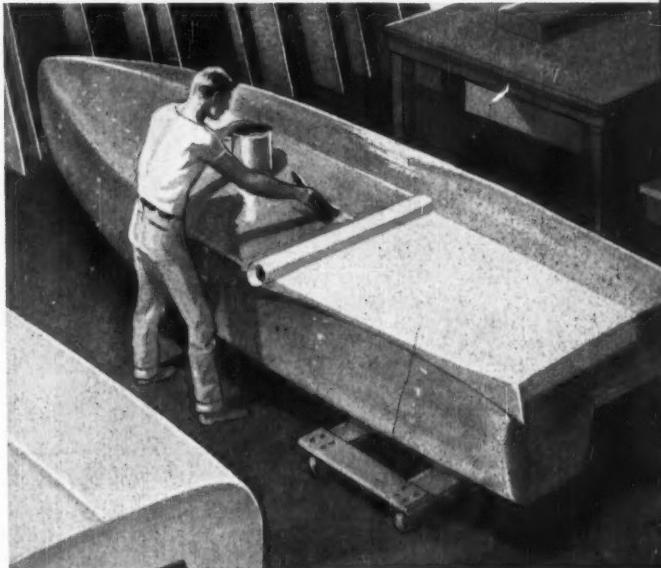
National Lead Company

111 Broadway, New York 6, N. Y.

VINYL FINISHES . . . BENTONE 27 gellant steps up weather resistance, color uniformity, spraying properties.



EPOXY RESIN ADHESIVE . . . BENTONE 27 gellant controls flow during cure.



POLYESTER GLASS-REINFORCED STRUCTURALS . . . BENTONE 27 gellant restricts sag in curing.

**NATIONAL LEAD COMPANY,
111 Broadway, New York 6, N. Y.**

In Canada:
**CANADIAN TITANIUM PIGMENTS LIMITED,
1401 McGill College Avenue, Montreal**

Gentlemen:

Please send folder on new BENTONE® 27 gelling agent, developed by National Lead Research.

KC-3443-W

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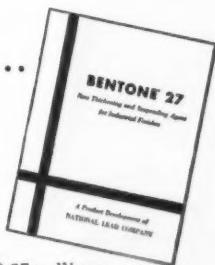
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VIEWPOINT

ALMOST simultaneously, Great Britain—key U.S. partner in the Atlantic alliance—signed a five-year trade pact with the U.S.S.R.; and the U.S. Dept. of Commerce revealed it has tightened up on exports to eastern Europe.

Russia buys synthetic rubber from Italy; but Commerce has cracked down on U.S. synthetic rubber exports to the Soviet bloc. And Russia buys carbon black in western Europe and even in Canada; but U.S. carbon black makers have their applications for exports to eastern Europe rejected.

Not only is our export policy inconsistent with our allies'; it is also inconsistent within itself.

The criterion for permitting or denying the sale of goods to eastern European countries is their strategic value. But U.S. businessmen, and the public at large, have the right to ask if our vague, inconsistent policies do indeed further our strategic interests—if denying a U.S. company a sale which will instead be rung up by its European competitor really hurts the Russians more than it hurts us.

And just what is "strategic"? Perhaps a good argument can be made that any item the Russians want is ultimately of "strategic value"; it must help them economically or they wouldn't want to buy it. If so, a consistent policy would forbid selling Russia anything at all. And, since Russia sells for a gain, the same policy would dictate buying no Red goods at all, whether benzene, or fur, or caviar.

That would be pushing consistency to an extreme in one direction. Perhaps we should approach it from another. Perhaps if the mysterious, shifting criterion of "strategic value" were solidly established in the minds of our policymakers, and set forth for the public, we might discover that reason dictated a more—not less—liberal trade policy.

Without the facts, we cannot know. We are not getting the facts.

Editor-in-Chief

TALL OIL TALK FROM Arizona CHEMICAL COMPANY

HOW MUCH TALL OIL IS THERE?

RIGHT NOW, TALL OIL IS IN GOOD SUPPLY. BUT, EVEN WHEN IT ISN'T, ARIZONA'S SOURCE IS ASSURED BECAUSE WE GET OUR BLACK LIQUOR SOAP FROM AMERICA'S LARGEST PAPER COMPANY. THIS GIVES ARIZONA CUSTOMERS A CONSTANT, RELIABLE SOURCE OF ACINTOL™ TALL OIL PRODUCTS.

MAKES LIGHT WORK OF HEAVY CLEANING

WHEN SCRUB SOAPS ARE IN ORDER—THINK ABOUT ACINTOL FA-1 AND FA-2 TALL OIL FATTY ACIDS. ACINTOL-BASE SOAPS ARE JUST THE THINGS WHERE CLEANING IS WANTED, WITHOUT THE PROBLEM OF SUDS!

ECONOMICAL VEHICLE FOR QUALITY FLATS

FLAT PAINTS REALLY GO PLACES WHEN VERSATILE ACINTOL TALL OIL PRODUCTS ARE THE VEHICLE! YOU REAP THE SAVINGS—WHILE PRODUCING PREMIUM PRODUCTS. FOR TALL OIL COSTS LESS—WHILE IT DOES A WONDERFUL JOB!

TALL OIL IS OUR BUSINESS

ARIZONA IS UNIQUE BECAUSE TALL OIL DERIVATIVES ARE OUR PRIMARY CONCERN. ALL OF OUR PEOPLE, PLANTS AND EQUIPMENT WORK TOGETHER TO PROVIDE ONLY TALL OIL AND PINENE PRODUCTS...THE BASIS FOR SOME OF THE WORLD'S FINEST PRODUCTS, MADE BY OUR CUSTOMERS.

**Arizona Chemical Company
(Incorporated)**

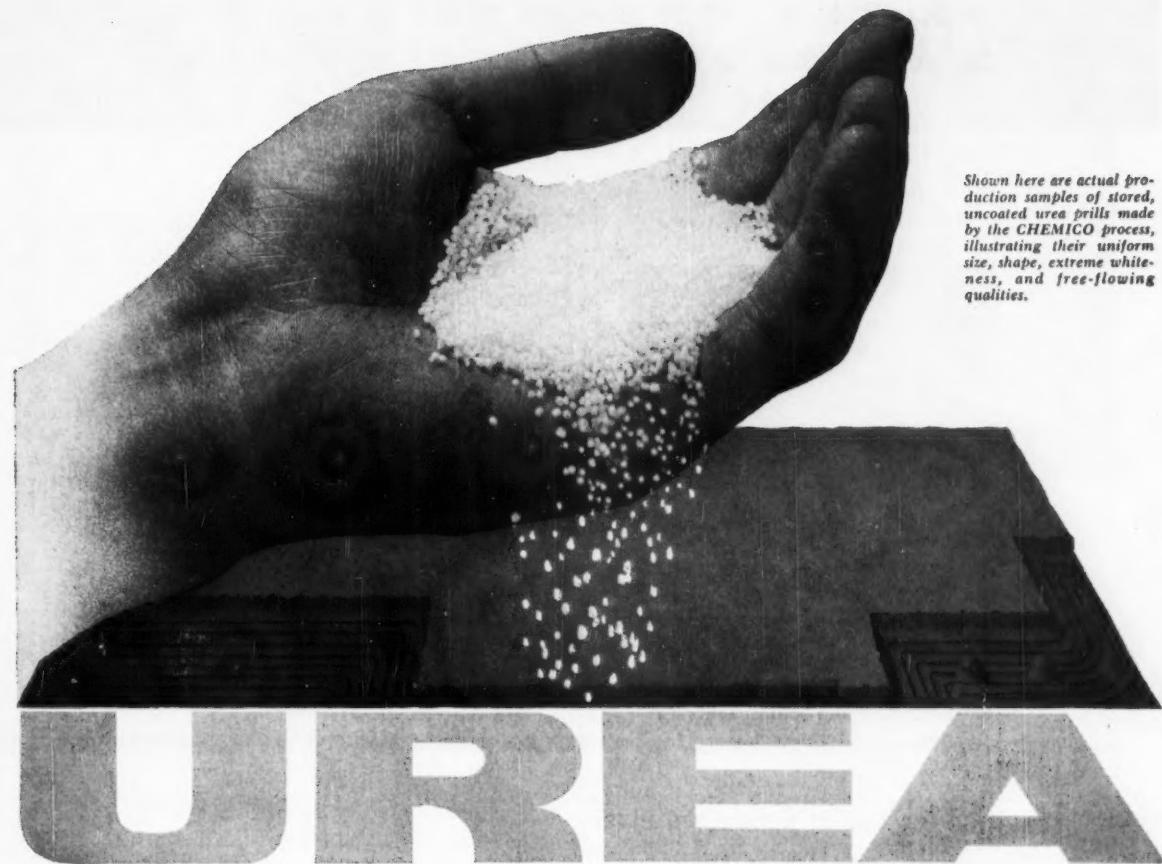
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Shown here are actual production samples of stored, uncoated urea prills made by the CHEMICO process, illustrating their uniform size, shape, extreme whiteness, and free-flowing qualities.

Over 1000 tons per day in production or under construction! That's the story of CHEMICO's process for making urea, one of the fastest growing chemicals in the feed, fertilizer and raw plastics fields. With its high nitrogen content, urea gives more plant food value per ton with lower handling costs. In the plastics industry, urea-formaldehyde resins are used extensively as textile and paper treating agents, adhesives, and molding compounds.

With costs a decisive factor in the urea market, the exclusive CHEMICO process offers increased efficiency, higher yields and a product with a guaranteed 46% nitrogen content. CHEMICO also offers the only commercially available, American-developed process. If you are considering the erection of a urea plant, contact CHEMICO's sales department for details on the performance-proven CHEMICO process.

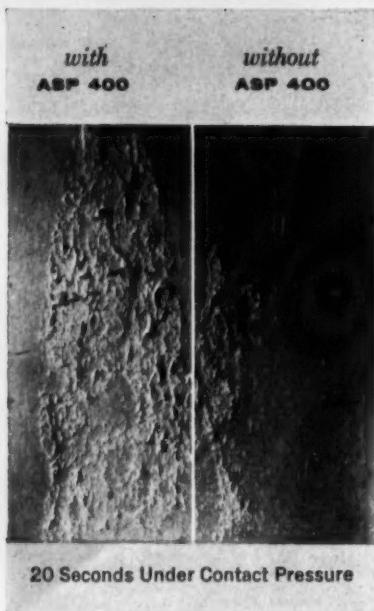


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news briefs...

ON THE CREATIVE USE OF M & C PROCESS MATERIALS



Adhesives Makers and Users: Bond Rupture Tack Test† proves fast tack development for adhesives containing ASP's

Photos show the extent of fiber pull obtained in rupture of adhesive bond—visual proof of the superior tack-time characteristic of adhesives modified with M & C's aluminum silicate pigments. This test is another of the M & C-developed evaluation tools for building into your adhesives fast tack and other "process-engineered" values, including

positive penetration control application flow adjustment
bond strength improvement

... and all at higher machine speeds. Check the coupon for helpful facts to improve your gluing operations.

†TEST: Adhesive is spread 1 mil thick on standard chipboard by use of a Boston-Bradley Drawdown Blade. Another section of chipboard is placed over film immediately and pressure applied—from 10 seconds to 3 minutes in individual tests—then the two sheets are pulled apart by hand, rupturing the adhesive bond along the longitudinal axis of the adhesive film.

Hard-top Cab of Reinforced Plastic uses Surface Modified ASP filler for formulating ease

Problem: achieving molding ease of large parts in laminating and gel coat operations.

Solution: M & C's organophilic Surface Modified ASP filler.

Results: excellent wet out, reduced viscosity, no agglomeration troubles plus highly favorable gel and cure times, and superior surface characteristics to withstand the rigors of road service. Do you have molding problems in your operation? Investigate M & C's family of fillers . . . new 21-page data folder, TI-1026, gives all details. Use the coupon for a copy.

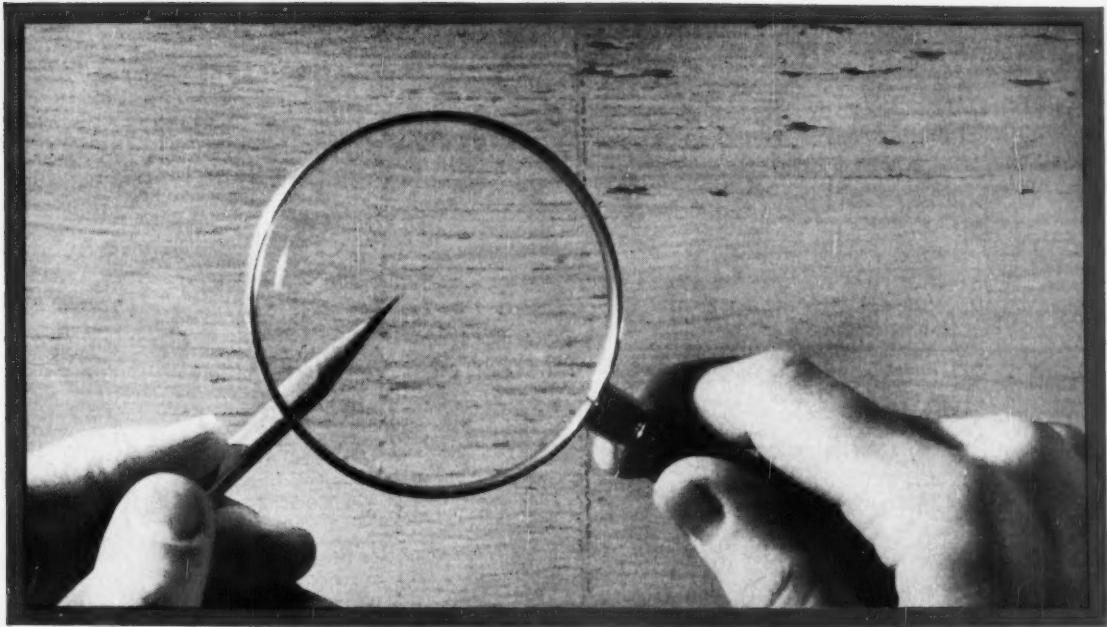


Minerals & Chemicals Corporation

7846 Essex Turnpike, Menlo Park, New Jersey

Leaders in creative use of non-metallic minerals

Export Department: Room 150, Garden State Parkway, Menlo Park, N.J. (Cable Address: "MICOR")



*Outside House Paints get new, high-value extender pigments

Focusing six years work, ASP's—M & C Aluminum Silicate Pigments—show same solid acceptance in outside house paints they've enjoyed for years in interior coatings. *Test Fence Proved:* excellent exposure rating for general appearance, gloss, chalking, checking, cracking, dirt collection, mildew, flaking. *Documented:* 12 properties of ASP's that give a score of advantages (including lowest costs) to manufacturers and users of outside house paints. This item is "starred" on the coupon. Check it.

Development Engineers: are you looking at the pattern for a better product?

The electron micrograph shows at 31,000 magnification the needle-like structure of attapulgite. Imagination in application is putting M & C's Attapulgus Clays processed from attapulgite into new uses by capitalizing on their chemical inertness and special physical characteristics:

high surface area . . . adsorbs, desiccates, catalyzes, buffers
colloidal . . . gels, imparts thixotropy, emulsifies, binds, suspends
high liquid adsorption, low bulk density

"Imaginapplication" of these properties led Attapulgus Clays into such diverse jobs as carriers for liquids, dispersing small quantities uniformly through large masses of solids or dispensing easily as solids; binding foundry sands; cleaning floors—and furs; thermal insulation; absorbing moisture in solids to shorten drying cycles; and high temperature mastic sealing . . . jobs now performed better than before and like-as-not at less cost—thanks to the properties built-in by nature. Look into the possibilities for improving your products with the Attapulgus Clays . . . use the coupon.



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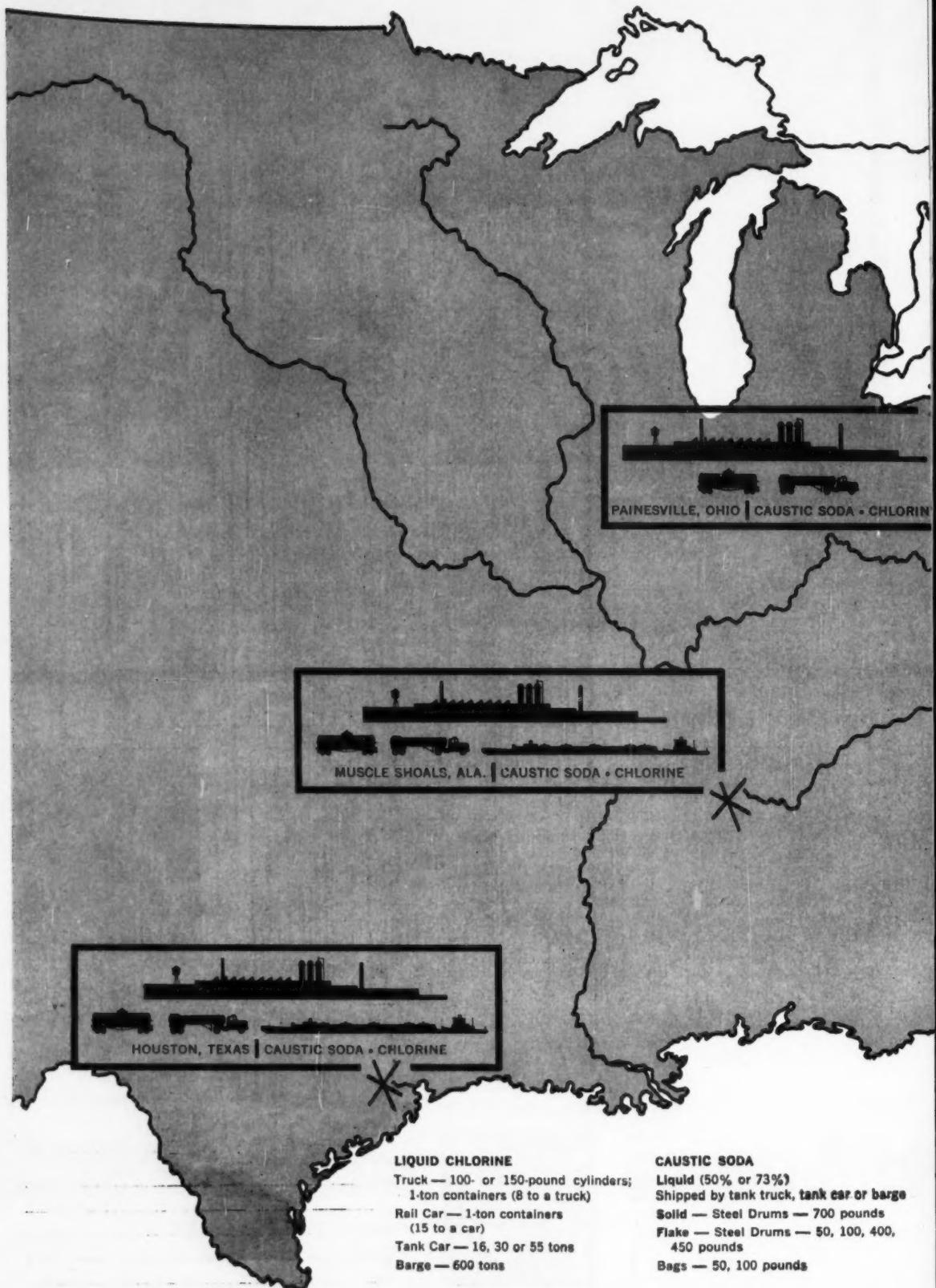
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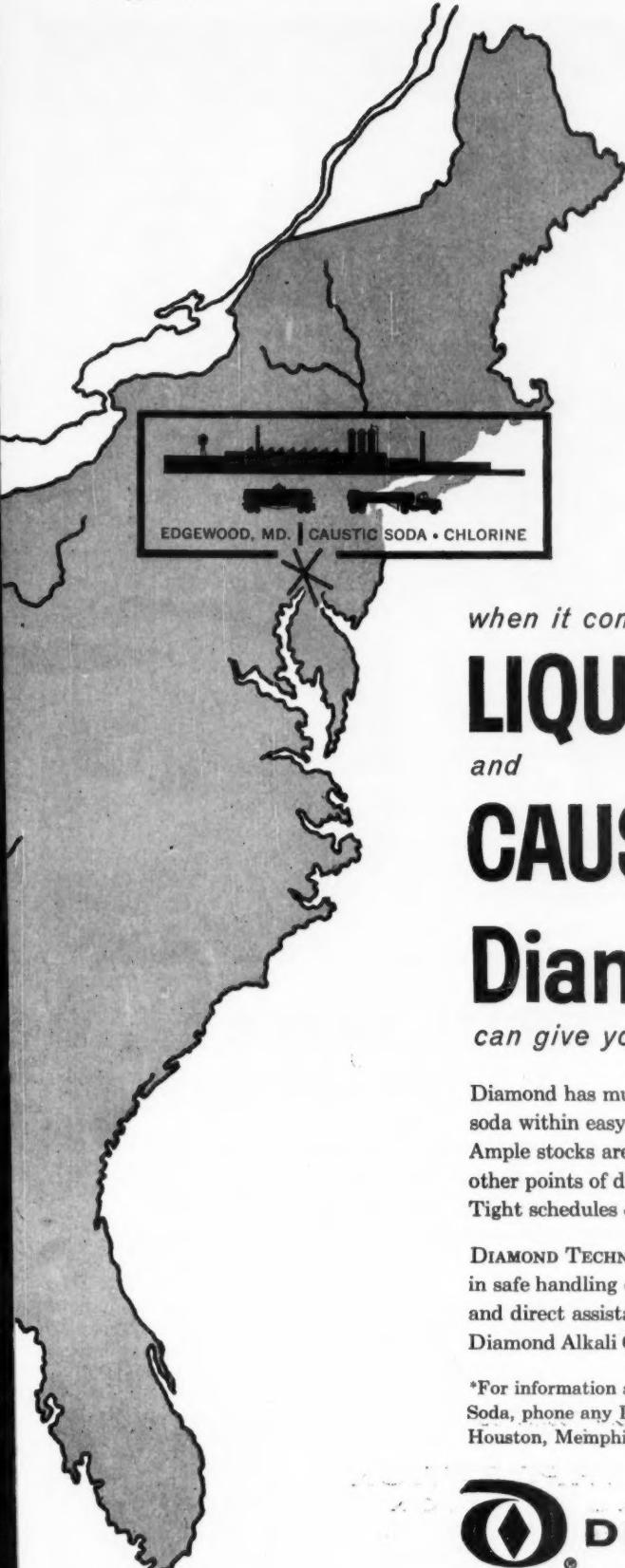
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Diamond Chemicals



New! EPON® RESIN 1002

When it's hot it pours!

Now you can say good-by forever to the hot weather annoyance of having granular resin solidify in the bag. *Shell Chemical's new Epon resin 1002 will not sinter even when your workroom temperature crowds the 100 mark!*

Epon 1002 is a new grade of resin that is hard and free-flowing at elevated temperatures. You will find it more economical to buy and use because it saves labor and handling costs.

It resists sintering during shipping and storage. Epon resin 1002 may be used as a direct replacement for popular Epon 1001 in amine-cured, clear and pigmented surface coating systems, pre-impregnated glass cloth and other applications.

Epon 1002 is similar in performance to Epon 1001. Coating systems based on either resin give superior impact resistance, flexibility, plus excellent

resistance to water, boiling caustic, many acids and most solvents. If force curing is desirable, Epon 1002 coatings are resistant to over-bake.

For greater ease in handling, Epon 1002 is packaged in 50-pound, polyethylene-lined, multiwall paper bags . . . simple to store and use. For complete information, including technical bulletin SC:58-107, write to your nearest Shell Chemical district office.

EPON puts the power in plastics

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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto



Business Newsletter

CHEMICAL WEEK
June 20, 1959

Clear evidence of the chemical industry's quickening sales pace shows up in the latest government figures. Seasonally adjusted, sales for the first four months were up 10.1% over the '58 period. The over-all rise isn't as steep as the 13.9% upturn scored by all manufacturing, but by April the chemical curve was climbing more sharply than the average. The March-to-April chemical sales rise: 5.3%, compared with 3.9% for all manufacturing.

The Niagara Falls area has lost some of its glitter as a plant site, The Carborundum Co. concludes from a survey it has just published. The area, Carborundum finds, "has been pricing itself out of the market." But the area is rated "above average" in employee relations, community services and facilities, and social, cultural and educational institutions. The company made the survey to help decide whether to plan future expansions in the area.

Seriousness of the infant death problem to polyethylene makers was underscored this week by the Society of the Plastics Industry's plans for a \$500,000 national advertising campaign to educate the public on the dangers of plastic-bag misuse. Some 117 newspapers in 100 major markets and radio facilities in 180 markets will be employed for the six-week-long "crash" program. It's designed to head off the mounting wave of infant deaths, save a 130-million-lbs./year polyethylene market, prevent what an SPI spokesman terms "hysterical" legislation.

Rubber tire producers face a new round of antitrust litigation —proceedings that could have major repercussions on CPI pricing policies.

The Federal Trade Commission late last week filed a broad price-fixing conspiracy case against 15 rubber producers and two trade associations. Target for the new attack: the industry's single-zone, delivered-price system. Under this system, FTC says, prices offered by those 15 companies to customers in a particular business classification anywhere in the country are "identically or substantially matched," through "pre-arrangement and understanding," and do not reflect differences in freight rates or manufacturing costs.

Key to the system, FTC charges, is the Rubber Manufacturers Assn.'s "Uniform Accounting Manual," which contains a formula used by the association to set "arbitrary and artificial pricing factors," based on confidential price information supplied by the companies. These, in turn, are used by the companies in setting their prices, FTC says. The defendants: The Rubber Manufacturers Assn., the Tire and Rim Assn., Good-year, Firestone, U.S. Rubber, Goodrich, General Tire and 10 smaller producers. FTC has won similar cases against National Lead and the Chain Institute.

Business

Newsletter

(Continued)

Three major CPI labor pacts were signed in the past few days.

• The strike at Olin Mathieson's E. R. Squibb Division plants in New Brunswick, N.J., and Brooklyn ended with members of the Oil, Chemical & Atomic Workers ratifying a two-year contract that provides for increases of 5½% the first year and an additional 3½% the second year. About 2,300 hourly paid employees had been on strike 40 days.

• American Viscose Corp. employees ratified a three-year agreement covering synthetic fiber plants at Front Royal, Va.; Nitro and Parkersburg, W. Va.; and Lewiston, Marcus Hook, and Meadville, Pa. Wage rates for about 8,000 employees will be increased 11¢/hour this month, an additional 5¢/hour next June, and another 5¢/hour in June '61.

• The United Rubber Workers and Firestone Tire & Rubber have signed a contract ending a strike that idled about 18,000 employees in eight plants. This contract—similar to agreements signed recently by Goodrich and U.S. Rubber (*see also p. 133*)—covers working conditions, pensions, insurance and supplemental unemployment benefits. Later this year, URW will bargain with major rubber companies for a general wage increase that is likely to be based largely on whatever settlement is reached in the steel industry.

Look for Mobay Chemical Co. to build the second polycarbonate plant in the U.S. It's reported already in the negotiation stage, with a final decision due in the next two months. First in production will probably be General Electric, slated to break ground for its Mount Vernon, Ind. plant in about six weeks (*CW, June 6, p. 25*). The GE plant's initial capacity, *CW* has learned, will be 1,200 lbs./hour, or about 10.5 million lbs./year, although it may eventually be expanded to 25 million lbs.

Buyers of Russian benzene were criticized on the Senate floor last week by Sen. Andrew Schoeppel (R., Kan.), who asserted that purchase of 54 million gal. "creates a favorable trade position" for the Soviets.

Even though the domestic price is "perhaps a little higher," Schoeppel declared, such contracts should not be made. "It is surprising," he said, "that leading firms in American business are purchasing Soviet-produced materials and products when there exists in this country, in some instances, an oversupply . . ."

One benzene producer in Schoeppel's state, incidentally, is Vickers Petroleum, which has spoken out against purchases of the Russian material. Schoeppel will suggest "several topics in this area" to the Senate Commerce Committee, which plans to begin hearings on foreign trade this summer.

Rumors that Russia has welched on the previously reported Dow benzene deal (*CW, Dec. 6, '58, p. 39*) are denied by Dow, which says that shipments are on schedule. In Moscow, Russian spokesmen refused to comment.



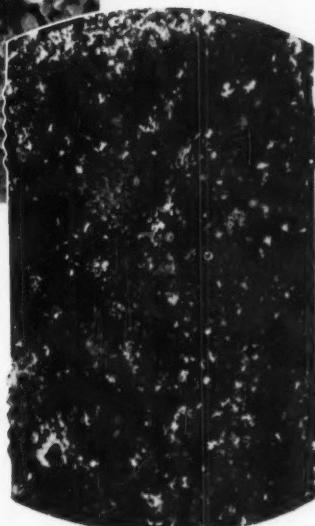
regular



fine



crystal



granular

photos show actual size of flakes

Flake caustic soda: pick the size that's right for YOU

You have a better than average chance of getting the size that's just right for your product or process when you select from these *four* Hooker caustic soda flakes.

The *Regular*, *Fine*, and *Crystal* sizes are especially firm and nondusting, thanks to a tightly controlled flaking-screening process. They're just thick enough to take handling abuse or breakdown in transit, just thin

enough to dissolve rapidly into solution.

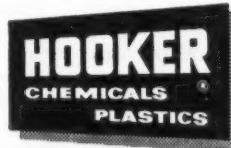
We'll be happy to send you samples and technical data. Write and tell us what sizes you're interested in.

If you use less than carload lots, ask your Hooker jobber to stock the sizes you need. If you are not familiar with the Hooker jobber in your area, we'll be glad to send you his name and address.

HOOKER CHEMICAL CORPORATION

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FLUIDICS



FLUIDICS AT WORK

Data on ion exchange as a unique unit operation

Have you considered ion exchange as a unit operation?

If you're used to thinking of ion exchange as only a method for purifying boilerfeed and process waters, you will be glad to learn that this same process can be a valuable aid in performing other functions.

Ion exchange is often far more efficient than other type unit operations, particularly where solutions are dilute—less than 2500 ppm, generally speaking.

We'll be glad to send you data concerning ion exchange usage for removing impurities from solution, for concentration and separation of dilute electrolytes in solution, for addition of specific ions to solution, and for catalysis, both acidic and basic.

We'll also send complete information on Permutit ion exchange resins and process equipment. Just circle "A" on the coupon.



FLUIDICS AT WORK

How ultra high purity water helps RCA produce COLOR TV tubes

Water used for washing the inside surfaces of RCA color TV picture tube envelopes must be ultra pure. Even a trace of iron or copper might discolor or deaden the sensitive phosphor coating that reproduces the color picture.

At RCA's Lancaster plant, washing was first done with distilled water. When tube production outgrew the capacity of the distillation equipment, RCA put in its first manually operated ion exchange units. When these, too, fell short of requirements, RCA called in Permutit to enlarge and modernize the complete demineralizing facilities.

Now the entire process is operated from one master control panel. There's plenty of water for production . . . and dissolved mineral content is even lower than when the water was distilled.

For more information on this process we refer you to the item on the left and to the letter "B" on the coupon.



FLUIDICS AT WORK

Do you have problems with wastes? Send for this bulletin

Here in eight pages you'll find concise comments on modern methods and equipment used for controlling, treating, and reclaiming industrial wastes.

The bulletin covers such knott problems as reclaiming chromates acids, and other valuable materials . . . removing fats and greases . . . neutralizing waste waters . . . complying with anti-pollution laws . . . etc.

Equipment described includes Precipitators, Colloidair Separators, chemical feeders, filters, ion exchange units, evaporators, meters and flow controllers, and CO₂ indicators.

There is also an outline of the complete engineering and testing service available from Pfaudler Permutit.

If waste is one of your problems and you want to know some of the practical answers, just circle "C" on the coupon for a copy.

FLUIDICS

**is a Pfaudler Permutit
program providing
the know-how
the equipment
and the experience
for solving problems
involving fluids.**

FLUIDICS covers such varied phases of fluid handling and control as:

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- corrosioneering
- reactions
- polymerization
- ion exchange
- fluid analysis, metering and control
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- evaporation
- distillation
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- blending
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- flow rate control
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Whenever you have a fluid-handling problem, look to this Pfaudler Permutit FLUIDICS program for the best solution.

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Pfaudler Permutit is a world-wide company with manufacturing plants in these countries:
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 Great Britain: Enamelled Products Corp. Ltd.
 Canada: Ideal Welding Co. Ltd.
 Mexico: Arteacerco-Pfaudler, S.A.
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FLUIDICS AT WORK

For low-cost gas analysis or control

If the gas component you want to measure or control is related to the specific gravity of the gas, a RANAREX will measure it accurately, continuously, without lag and at low cost.

Works on a simple, mechanical principle . . . rugged, foolproof. Can be equipped for automatic control. Analyzes flue gas to cut fuel costs . . . aids quality control in heat-treating, chemical processing, oil refining . . . checks uniformity of fuel gas, etc.

For details and complete specifications, circle "D" on the coupon.



FLUIDICS AT WORK

Glassed ductile iron* fittings with strength comparable to Glasteel's

Now you can get glassed, ductile iron fittings that are 2½ to 3 times as strong as conventional gray iron. 60,000# tensile strength, 45,000# yield, 15% elongation.

Thermal shock resistance is now comparable to Glasteel 59's. Corrosion resistance is also the same as Glasteel's . . . handles all acids except hydrofluoric.

July 1st delivery on 45° and 90° elbows, tees, and crosses in 1½-, 2-, 3-, 4-, and 6-inch sizes.

Circle "E" on coupon.

*Patent Pending

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Amides • Amines • Quaternaries

A broad new line of fatty nitrogen chemicals is now available in production quantities from ADM . . . including some interesting compounds never before offered commercially.

We call them Adogens. Included are primary, secondary and tertiary amines, quaternary ammonium compounds and amides. They are derived from coco, tallow, hydrogenated tallow and marine fats and oils. The Adogens include the widest variety of amides commercially available.

An ADM innovation is the creation of tri-fatty amines and other complex terpenes through a novel ADM process that makes possible selective control of the chains added.

The Adogen line is also the first to offer extremely long chain fatty nitrogen chemicals in the arachidyl and behenyl range. These C₂₀ and C₂₂ compounds offer a number of interesting new characteristics.

Such extra-long-chain Adogens are possible be-

cause of ADM's unique position in the marine oil field. We long have been leaders in the chemistry of fish and marine oils, going so far as to run an extensive whaling operation. Because of our basic position, we can offer long-chain amines from these raw materials at attractive commercial prices.

The same close control of other raw materials, and ADM's position as a basic fatty acid producer, insure top quality throughout the Adogen fatty nitrogen chemical line. All of the Adogens show excellent color. The new ADM fatty amides and fatty quaternaries, in particular, promise users the advantage of whiter end products because of their lighter color. Adogen primary amines and amides have excellent stability in storage.

For further information on fatty nitrogen chemicals, write our Development Department.



Primary



Secondary

If 'radiation rheumatism' affects your bearings, try fatty hydrocarbons

Like the wonder drugs, nature's fats and oils can crop up in the strangest places. ADM's fat-derived olefins and hydrocarbons, for example, are likely candidates for a number of interesting uses in the nuclear energy field.

As contrasted to their petroleum in-laws, they show some remarkable advantages. Because of their relative stability under radiation, the fat-derived compounds are worth considering for use as lubricants in radioactive situations. Evidence is they do not break down as rapidly as conventional lubricants. Also, there is the possibility of their functioning as superior heat exchange agents in atomic power reactors.

Supposed reason for the radiation stability of the fatty olefins and hydrocarbons is the orderly straight-chain structure of these new chemicals derived from tallow, marine, or vegetable oils. In branched-chain hydrocarbons from petroleum, the short side chains are more easily split off by high energy waves or dashing particles.

Straight-chain, or fatty, hydrocarbons are also possible solvents for recovery operations on spent reactor fuel elements.

There is literature suggesting the use of fatty oils . . . of which the normal hydrocarbons would be the best bet . . . as a top layer on "swimming pool" reactors to shield the operator from the effects of radioactive isotopes in the water.

ADM invites your inquiries concerning specific problems along these lines.

USE OF THE GAS CHROMATOGRAPH for production line analysis is one more way in which ADM has advanced the science of chemical quality control. This remarkable instrument does in hours what formerly took weeks or months. Advanced analytical techniques like this, coupled with ADM's control of raw material quality mean that ADM safeguards quality and uniformity throughout the manufacturing process.



GET YOUR COPY of the new ADM Chemical Products catalog. This 52-page book gives specifications of the many types of aliphatic chemicals made by ADM. Write on your company letterhead today.

Chemifats from Nature's Wondrous Warehouse

The Research Chemists' *Corner*



'Automatic percolator' extracts a quicker brew

When you run as many solvent extractions as ADM's busy control chemists do in a day, it's a cinch one of them will turn up with a scientific short cut such as this. Though it looks perfect for making Kentucky moonshine, this efficient laboratory device was developed by ADM chemists for improved and faster liquid-liquid extraction of oils from aqueous solutions. It works especially well for total fatty acids, unsap, and oxy acid determinations. Right now it's our own procedure . . . but we'd like to share it. Our control chemists report it has been proposed for consideration as an industry standard.

The extractor bubbles clean petroleum ether through the sample continuously, keeping it agitated all the while with the magic of a magnetic stirrer. All in all it appears to be as close to perpetual motion as the scientist will let you come. Want to know more? Then drop us a note on your letterhead.

 *Adogen*
symmetrical terpenes
offer
research possibilities

We think the new tri-fatty amines now offered by ADM present interesting possibilities for research chemists. We frankly don't know as much about their uses—yet—as we would like to. We're going to be working with them to find out, and we trust others will, too.

We do know that our unique process enables us to control the structure of our terpenes to get three identical chains . . . or "custom made" non-symmetrical terpenes with lengths from C₄ to C₂₂. Some of the possibilities for introducing branched chains are of particular interest to our own people. Quaternaries from these terpenes are fascinating, too.

Sample quantities of selected compounds are available now. If your proposed use sounds good, we might discuss making something special. Write our Development Department.

**Archer-
Daniels-
Midland**



CHEMICAL PRODUCTS DIVISION

707 Investors Building • Minneapolis 2, Minnesota

OPINION

Forecasting an Art

TO THE EDITOR: A tree does not make a forest. The single example cited by Mr. J. R. Horsey in his letter (*May 9, p. 16*) regarding the Gompertz curve does not prove its merit. Detailed studies by ourselves and others have shown that forecasting is a difficult procedure at best, which calls for the use of every trick in the trade.

The implication is made that forecasters use only one method. This is not true. Skilled forecasters use many methods.

Despite Mr. Horsey's single example, application of mathematically calculated trends to the products of the chemical process industries has been generally disappointing. In 1952, the National Industrial Conference Board issued a booklet, "Growth Patterns in Industry," by Frederick W. Jones. In this book, Mr. Jones made a computation of growth curves for commodities and demonstrated that in general the results were poor when applied to forecasting.

I do not claim that the Gompertz curve is useless. I wish only to emphasize that forecasting is still an art based on scientific method and requiring great personal skill on the part of the analyst.

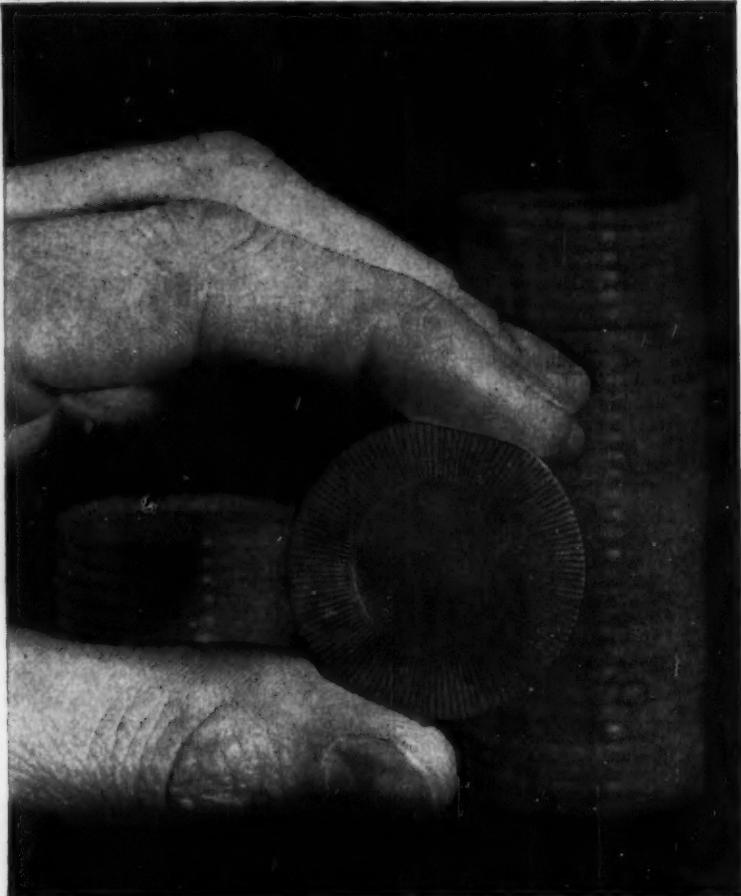
WILLIAM COPULSKY
Director, Business Development
Dept.
Chemical Group
W. R. Grace & Co.
New York

Fair-Trade Advocate

TO THE EDITOR: [Re] . . . your article (*April 11, p. 10*) regarding "fair trade." . . .

I suppose I cannot persuade you to my way of thinking on the subject of fair trade.

Briefly, I have a very strong feeling for the importance of maintaining numerous and prosperous independent businessmen. By and large, they give the local community the responsible leadership it needs in local matters. Without that local leadership, democracy could not function in this highly complex age. Justice Douglas has developed this same idea rather thoroughly in various articles, speeches and court decisions. Furthermore, prosperous independent businessmen



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...a guarantee of satisfaction goes with every sale

Wyandotte Chlorine is like a gilt-edged security. You can *count* on its value . . . because we sell it with a guarantee of satisfaction.

Right up to delivery at your door, our chlorine is under rigid control . . . pampered every step of the way, from basic raw materials to finished product. What's more, we follow through with the highest caliber technical service—at *your* service anytime.

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Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

form a bulwark against concentrated economic power caused by absentee ownership.

All of the above simply sets out a general philosophy of small business. It strikes me that fair-trade legislation is the most effective method of accomplishing the objective of retaining numerous and prosperous independent businessmen.

With respect to your point No. 2 that fair trading would, in effect, subsidize marginal retailers, let me call your attention to an article in the *Congressional Record* for Feb. 19, 1959, by Senator Proxmire (D., Wis.), which shows how the fair trading of gasoline in New Jersey promoted low prices while preventing unfair competition. Fair trading prevents the predatory pricing practice by those who loss-lead a few well-known articles and make up the difference by increasing their margin on others.

Similarly, the enforcement provisions of S. 1083, the Federal Fair Trade Bill introduced by Senator Proxmire and myself, would be used in the vast majority of cases by private persons rather than by any federal administrative agency.

It seems to me that before fair trade can be intelligently discussed, the persons involved in the discussion must first ascertain their respective positions regarding small business generally. As I have pointed out above, I am quite committed to the notion that numerous, prosperous businessmen are necessary for the proper functioning of American free enterprise and American democracy.

SENATOR HUBERT H. HUMPHREY
Senate Office Building
Washington, D. C.

Foreign Research

TO THE EDITOR: I have read with interest your article "How to Cash In on European Research" (March 28, p. 42).

I have had contact with European firms, universities, etc., since 1948; first, as an executive for American chemical companies, and, since '55, as an independent consultant.

Generally, I agree with the comments made by Mr. R. M. Burns of SRI, but would like to add the following to his observation.

Besides the three suggestions made



What's your trump card in liquid caustic?

...let Wyandotte help you select the right grade

An increase in your caustic requirements, or a change in freight rates can alter your economic position almost overnight in regard to 50% or 74% caustic concentrations . . . so it pays to keep track of the score. This is where Wyandotte can be of great help to you. For, with the exclusive chart contained in our free guide, *74% or 50% Caustic Soda, Which for You?* you'll be able to check freight rates against conversion costs very quickly. And for a thorough analysis of all factors, your Wyandotte technical-service man is always on call. Write us today. *Wyandotte Chemicals Corporation, Dept. 764-W, Wyandotte, Michigan. Offices in principal cities.*



Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

OPINION

by him to "turn a profit from European research know-how," there is a fourth way: supporting university research in Europe.

Many such arrangements have been made by American companies in the particular fields of their special interest, and I myself established the contacts for a number of arrangements made in countries throughout Europe.

This type of arrangement has been found to be inexpensive and has proved to be quite satisfactory. It is not, of course, as broad in its aspect as the establishment of a laboratory where the work can be more closely controlled.

However, as a starting point for European contacts, university projects have proved very fruitful, particularly because these projects can be made in several countries, thus obtaining an interesting variety of background and opinions.

Furthermore, I would like to comment upon the upkeep of European laboratories. Probably the least expensive country is Austria where the cost per professional man, including all services, would be considerably less than the figure quoted in your article for England (\$13,500 per year).

RALPH N. LULEK
Chemical and
Management Consultant
Candlewood Isle, Conn.

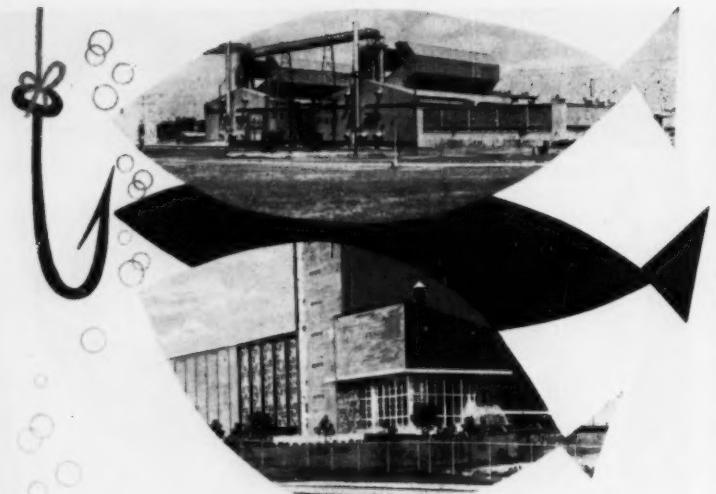
MEETINGS

Air Pollution Control Assn., annual meeting, Statler Hotel, Los Angeles, June 22-26.

Gordon Research Conferences: At Colby Junior College, New London, N. H.—petroleum, June 22-26; catalysis, June 29-July 3; polymers, July 6-10; textiles, July 13-17. At New Hampton School, New Hampton, N. H.—chemistry of coal, June 22-26; proteins and nucleic acids, June 29-July 3; magnetic resonance, July 6-10; organic reactions and processes, July 13-17. At Kimball Union Academy, Meriden, N. H.—physical metallurgy, June 22-26; nuclear chemistry, June 29-July 3; solid-state studies in ceramics, July 6-10; chemistry, physiology and structure of bones and teeth, July 13-17.

American Assn. of Cost Engineers, third annual meeting, Carnegie Institute of Technology, Pittsburgh, June 24-26.

Society of Chemical Industry, 78th annual meeting, Glasgow, Scotland, July 6-11.



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... and More—
in the Southeast Coastal 6!

One formula *every* chemical plant needs for success is H₂O. And you don't have to mix your own in the Southeast Coastal 6. Broad, deep rivers of high-grade water lace the fast-growing states of Virginia, North Carolina, South Carolina, Georgia, Florida, and Alabama — creating a dreamland of profit potential.

Expanding markets, natural resources, favorable tax rates, pleasant climate, willing labor, low-cost transportation and all the other money-making conveniences are waiting for you here.

So call, wire, or drop us a line and land a site especially suited for your needs in the Southeast Coastal 6. Our experienced industrial location specialists will go right to work for you — in the strictest confidence, of course.

Address: R. P. Jobb, Assistant Vice-President,
Department K-69,
Atlantic Coast Line Railroad,
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KRAFT BAG CORPORATION, through correct construction of your multiwall shipping sacks, will reduce seepage and spoilage of contents while minimizing your shipping and storage problems.

*If your product fits into a bag –
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Our Newest **KRAFTPACKER**

Open Mouth Bag Filling Machine provides maximum accuracy and speed. May we tell you about our stainless steel models? Remarkable in performance. Surprisingly low in price.



- We are interested in improving our bag.
- We are interested in your Kraftpacker.

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example**



There's a steel container to meet almost every shipping need

Petroleum is like many other products, spending some part of its life in a steel shipping container. A wide variety of products arrive at their destinations stable, safe, sanitary, in carbon or stainless-steel shipping containers that are manufactured by United States Steel.

USS steel drums and pails come in a variety of sizes and closures, offering flexibility in choosing a shipping

container, whatever you may manufacture. They represent the largest, most complete line available today, for the shipment of products as varied as paint and petroleum, chemicals and food, additives and essences.

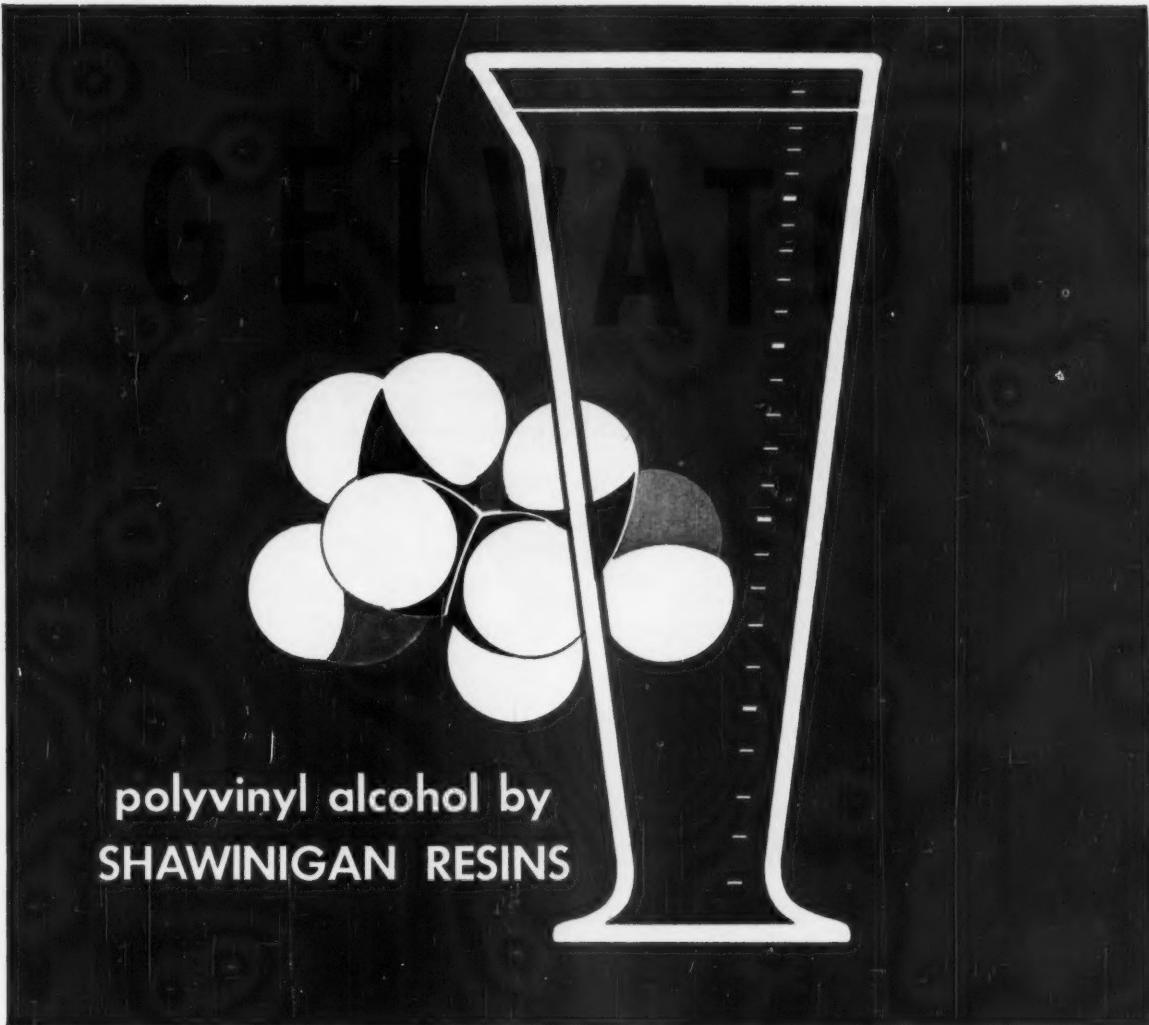
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Factories: Los Angeles and Alameda, Calif. • Port Arthur, Texas
Chicago, Ill. • New Orleans, La. • Sharon, Pa. • Camden, N. J.

United States Steel Products

**Division of
United States Steel**



Chemical Week • June 20, 1959



is clearly superior

Shawinigan's modern process controls keep GELVATOL clear in solution . . . the yellowish cast associated with most polyvinyl alcohol solutions is virtually eliminated. Furthermore, the resin's molecular composition is held within tight limits, thus reducing the slight haze normally found in solutions. These are meaningful advantages to polyvinyl alcohol users.

Twelve grades of commercially proved GELVATOL . . . which meet all top quality standards . . . are now available to you for more efficient, more profitable formulating. There are standard grades for adhesives, textile sizes, paper coatings and films, and the new extremely low-viscosity grades for specialty applications.

GELVATOL® — polyvinyl alcohol by

These are important advantages:

1. Rapid water solubility, and clear solutions.
2. Particle size that minimizes dusting.
3. GELVATOL requires 25-50% less storage space.
4. Notable uniformity from bag to bag, lot to lot.

Write today for full technical information and sales service to Shawinigan Resins Corporation, Department 1124 Springfield 1, Mass.

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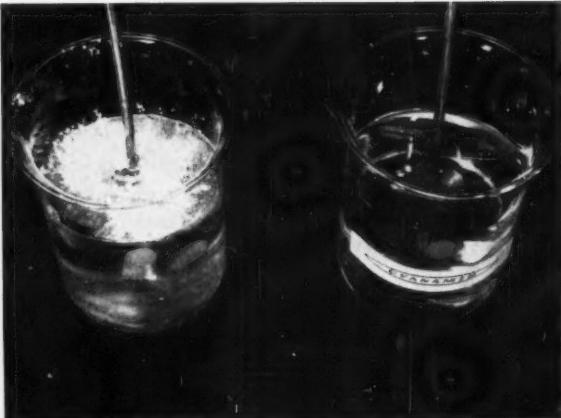
CYANAMID

Chemical Newsfront

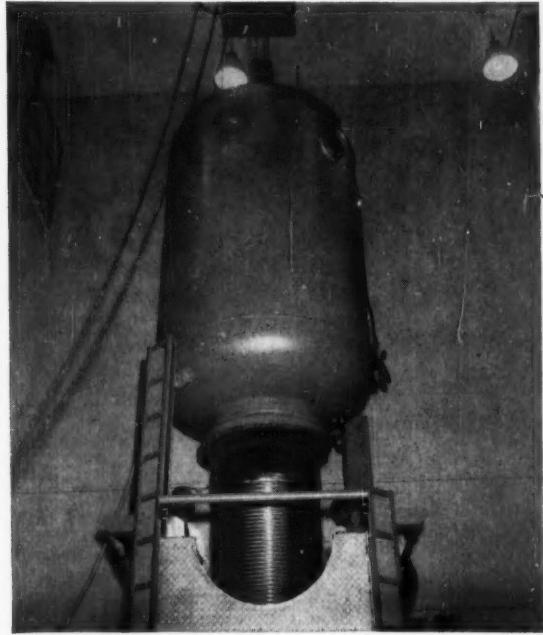
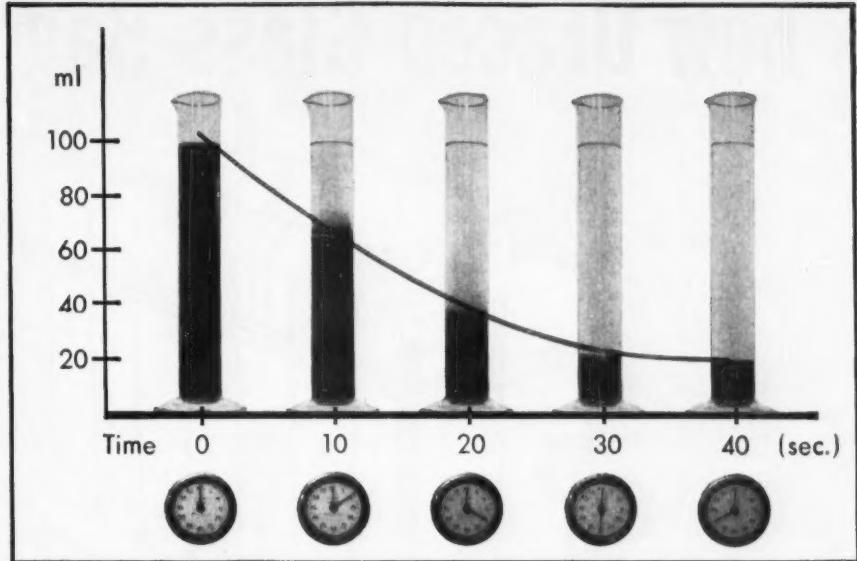


NEW LIFE FOR PLASTICS is the achievement of Cyanamid's CYASORB® UV 24 Light Absorber. This light-stabilizing chemical substantially improves the color retention and durability of vinyls, polyesters and other resins. Chemically, CYASORB UV 24 is 2,2-dihydroxy-4-methoxybenzophenone, a pale yellow powder, which is relatively inert. It has absorptive characteristics through a wide range of the ultraviolet portion of the spectrum, and is particularly effective from 300 millimicrons, the lower end of the spectrum, to 380 millimicrons. Because of its high absorption capacity, it is low in cost on a performance basis. CYASORB UV 24 is especially beneficial in plastic films and surface coatings. (Intermediates Dept.)

TWO NEW CYANAMER® WATER-SOLUBLE ACRYLAMIDE POLYMERS, P 250 and P 26, dissolve fast, give clear solutions. In the unretouched photograph, right, CYANAMER P 250 (right) has dissolved completely one minute after being added to water, while a competitive resin remains on the surface. P 250 is a high molecular weight polymer. It is an economical thickener for water solutions. P 26 is a low molecular weight product. It is ideal for blending with P 250. Mixtures of the two can be used to prepare solutions of desired solids-viscosity relationship. Write for more information. (Market Development Department)



INCREASED SETTLING RATES and clarity of overflow in thickening operations are achieved with SUPERFLOC* 16 Flocculant, Cyanamid's newest mining chemical, as demonstrated in the chart at right. Already used as a flocculating agent in uranium leaching operations, SUPERFLOC 16 is also applicable as a filtration and settling aid in other ore beneficiation processes, waste-treatment operations and in coal preparation. SUPERFLOC 16 is an effective settling and filtration agent in highly acid, neutral and alkaline suspensions. For complete information on the use and testing of various Cyanamid synthetic flocculating agents, write for our brochure, (Explosives and Mining Chemicals Department)



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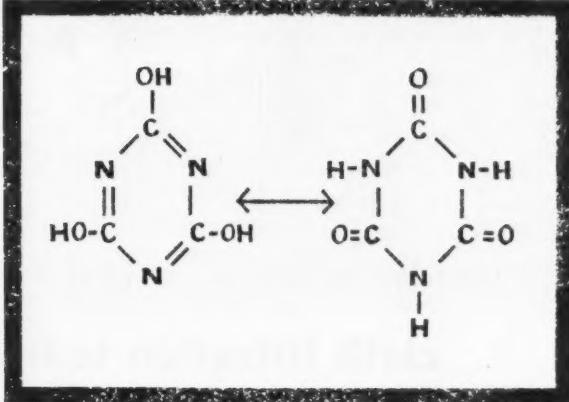
(Central Research Division)

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(Process Chemicals Department)

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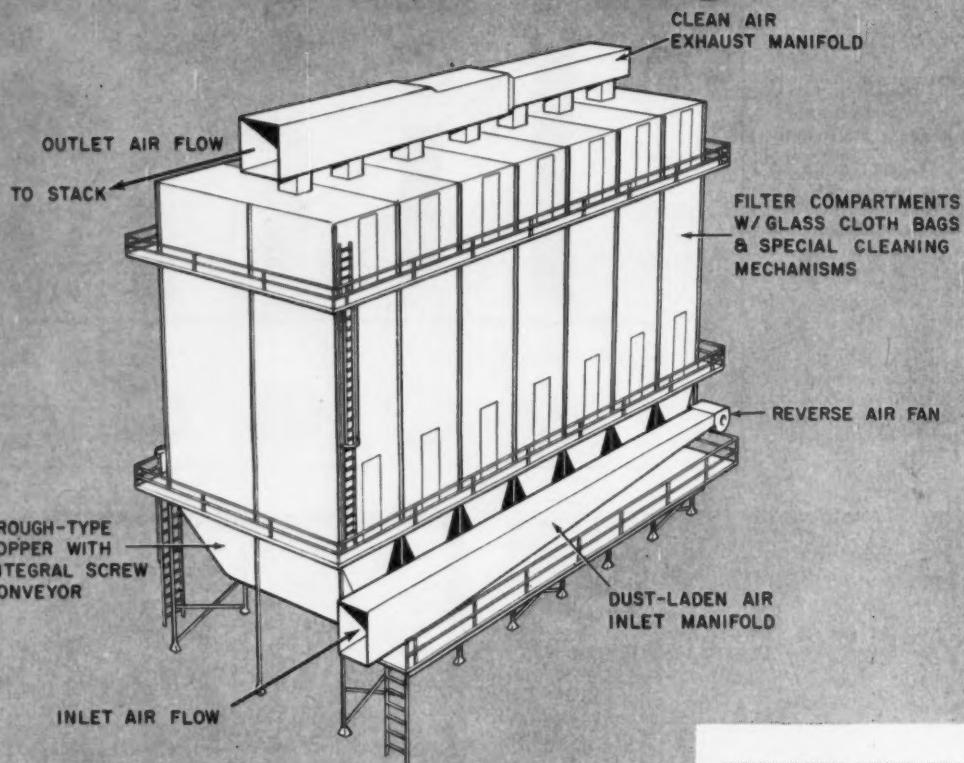
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cloth filtration to 600° F. with safe bag cleaning by sonics

Radical design innovations including dust removal by "sound" now make Dracco Glass-Bag Filters a vital new weapon in industry's fight against hot, corrosive dust and fumes.

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cement kilns • reverberatory furnaces • calciners • converters
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dust control equipment
(Pronounced Dray-co)

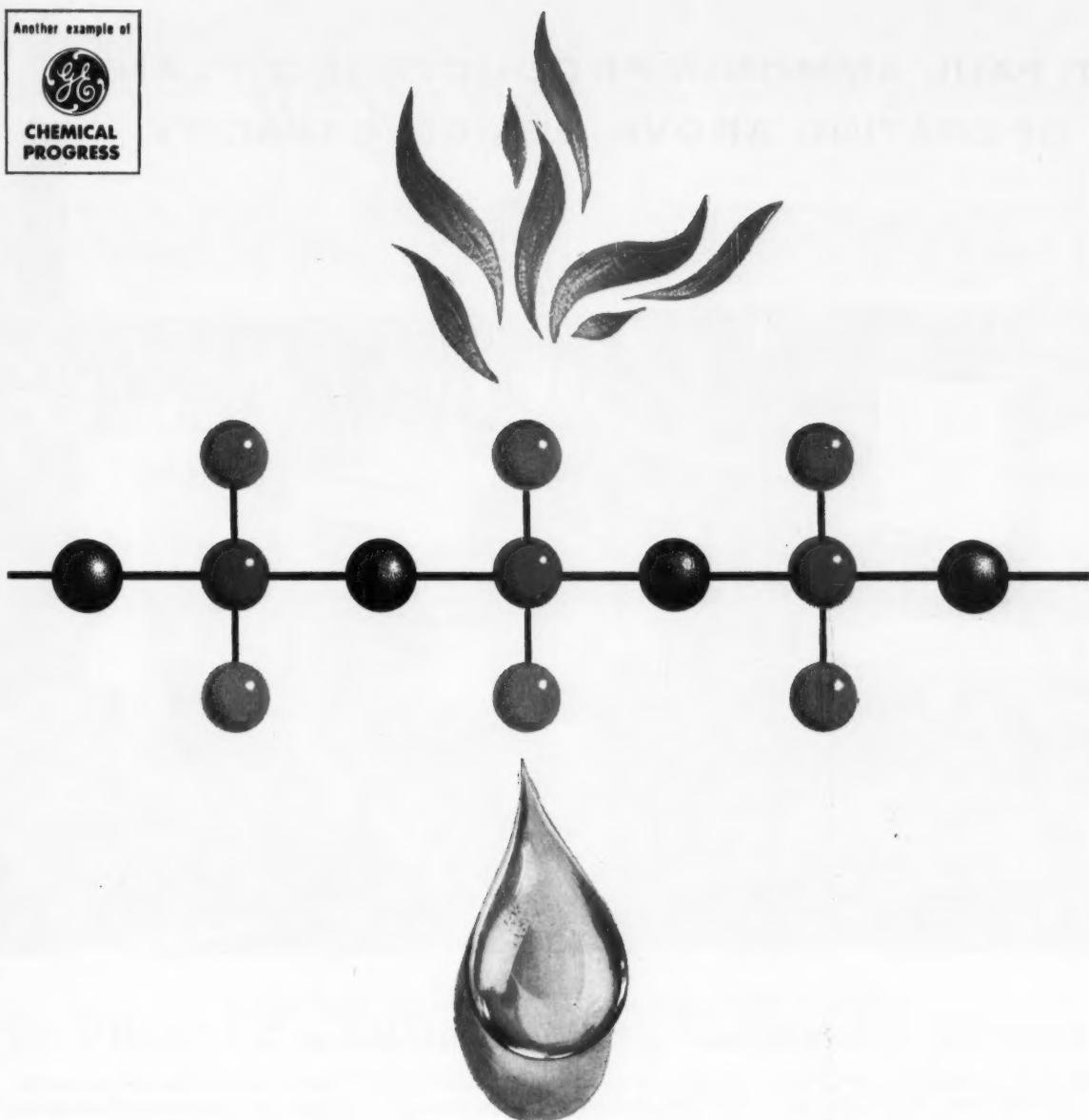
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Sonoclean—patented cleaning by sonics . . . low-frequency vibrations transmitted to bags at safe energy levels . . . no deflection, creasing or fatigue . . . no bag wear . . . no personnel hazard.

Reverse Air Flow—relaxation of bags accomplished by isolating filter compartment from main collector fan with control valves . . . low-velocity fan provides reverse air to collapse bags . . . results in effective cleaning without wear . . . no shaking required.

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Chemical research at General Electric has created new silicone materials that are giving you better control over moisture and temperature . . . in "breathable" water repellents for clothing, leather and masonry . . . in lubricants and tough elastomers that work as well in space-cold missiles as they do in red-hot jets.

G.E. pioneered in silicone chemistry when silicones existed more in theory than in fact. Today, with the same creative imagination, G-E chemical research is finding new plastics . . . resins . . . laminates . . . electrical insulating materials . . . to help you improve your product or manufacture it more efficiently.

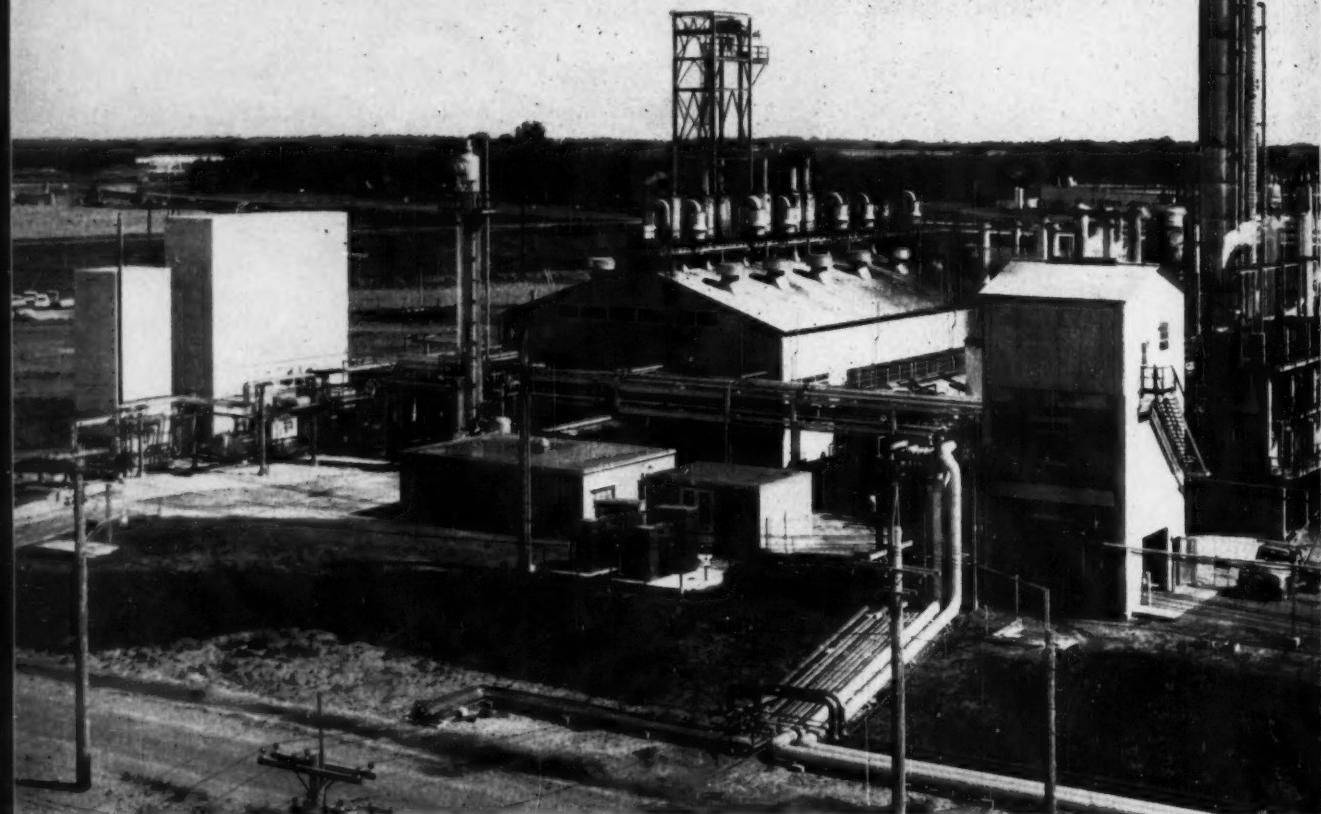
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ST. PAUL AMMONIA PRODUCTS, INC. PLANT OPERATING ABOVE DESIGN CAPACITY



Ammonia Plant—Designed, Engineered and Constructed by Lummus—Feeds Natural Gas or Butane

The St. Paul Ammonia Products, Inc. plant at Pine Bend, Minnesota has been operating continuously at rates above the design capacity of 200 tons per day of ammonia. Lummus' policy of close cooperation with the client at every stage was followed at St. Paul Ammonia. Lummus' extensive experience in plant design and construction have been effectively combined with the experience in plant operation of St. Paul Ammonia's capable staff in order to achieve a successful project.

In addition to producing anhydrous ammonia and ammonium nitrate solutions for the fertilizer industry, St. Paul also produces anhydrous ammonia meeting industrial specifications.

The Texaco Synthesis Gas Generation Process is employed to produce

hydrogen for ammonia synthesis. Natural gas direct from the pipeline is normally used as the raw material. However, during the cold Minnesota winters the supply of natural gas is subject to interruption when preference is given to household users. The plant is designed so that at these times butane is used as the raw material.

The large compressors are gas-engine driven and use natural gas fuel except during the winter months, when propane from storage tanks is employed. The Lummus design fits the plant to the needs of the area and permits this sort of flexible operation.

This plant utilizes a hot potassium carbonate system for removal of CO₂, which helps reduce production costs.

Lummus acted as general contractors for the entire project which includes ammonia synthesis, nitric acid, and ammonium nitrate solutions units, and offsite facilities including utilities, tankage and product shipping.

Lummus has experience in design and operation of ammonia plants utilizing natural gas, heavy fuel oil, butane, and waste chlorine cell hydrogen. Capacities of Lummus built ammonia plants range from 60 to 300 tons per day.

In the past 50 years, Lummus has built over 800 plants to produce petrochemicals, chemicals and petroleum products. If your company is planning facilities of this kind, discuss your plans with Lummus.

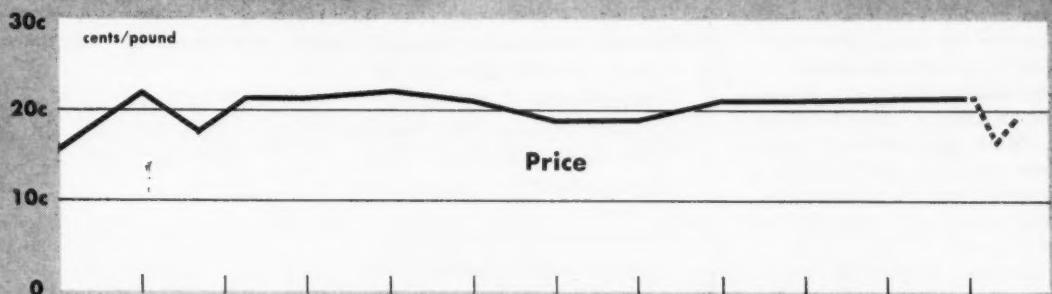


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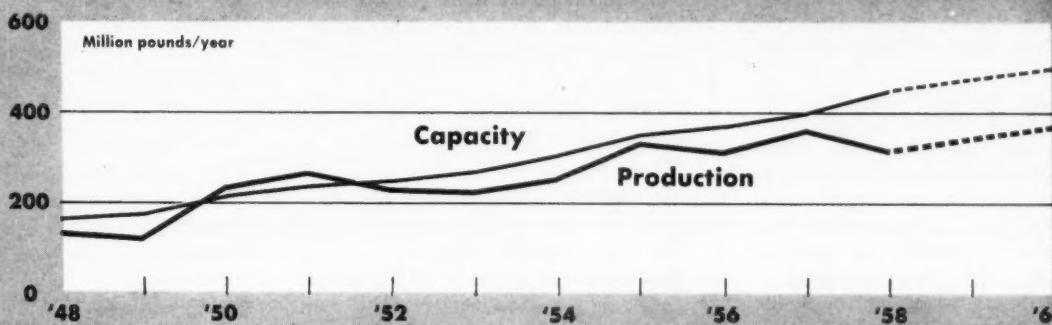
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June 20, 1959

Phthalic's Prices . . .



and Growth



In Phthalic's Future: Price, Capacity Boosts

Flaring up again this week: the frequently frantic question, what price phthalic anhydride?

As far as Reichhold Chemicals is concerned, the 17¢/lb. price that has been in effect since January is now going to be supplanted by a 19¢ tag. But other producers say they'll stick with the 17¢ rate — though possibly only for a matter of weeks.

Just two things are for sure about the current price:

- Customers love it; they've been buying avidly — and probably salting away tons of PA in warehouses.

- Producers hate it; insist that it nets them little or no profit, despite the huge sales volume.

Expansion, Anyone? Aside from their disagreement over pricing tactics, producers also are divided on the

proper strategy for meeting future U.S. requirements for this versatile product. Here again, Reichhold takes an individualistic stand.

As company President Henry Reichhold sees it, demand for phthalic has doubled over the past decade (*chart, above*) and will probably gallop along at about the same gait for the next five years or more. And he backs up this optimism by saying that RCI is planning to build another PA plant — this one somewhere in the Midwest, with capacity of 30 million lbs./year.

Most other producers foresee continuing good growth for phthalic, but don't see any need for rush-rush expansion. Monsanto Chemical's view, for example: "We anticipate a slow but steady growth for the product,

but are of the opinion that capacity now in place exceeds by 20% what would be normal requirements."

Leveling-off Predicted: At the other end of the scale from Reichhold's optimism on PA is the belief held by some industry men that a leveling-off is in store for phthalic demand. According to them, production of alkyd resins — No. 1 application for phthalic — has moved onto a plateau; and export sales can be expected to keep dwindling.

Maverick among PA producers is Amoco Chemicals, Standard Oil Co. (Indiana) subsidiary, which last year scuttled the 21¢ price that had prevailed for more than two years (*CW Market Newsletter*, Jan. 31). Amoco has proclaimed that its new plant at Joliet, Ill. — which uses ortho-xylene,

instead of naphthalene, as feedstock — could earn a satisfactory profit on 17¢/lb. phthalic.

And Amoco tenaciously clings to this position despite the fact that the Joliet plant — originally scheduled to be in operation last fall — is still not in commercial production.

Late last week, Amoco again declined to say when its new phthalic unit — beset by "minor mechanical difficulties" — would be onstream.

Buyers' Market: So long as Amoco reasserts its intention to sell PA for 17¢/lb., other producers can expect customers to resist price increases, even though Amoco's projected output would supply only about 4% of current demand.

One ace held by phthalic buyers: their present inventory position. Regarding 17¢/lb. as a bargain-base-ment price, consumers have been buying all the PA they can get. Producers have been operating their phthalic plants at capacity.

Several producers say they have been allocating phthalic to their customers; one says it has been "policing" sales. With so much of a PA backlog, customers are likely to start trimming their purchases late this summer — particularly, say some industry men, if the price is boosted.

Nevertheless, even the companies that don't agree with Reichhold on the wisdom of an immediate price hike are in close accord with Reichhold's contention that the current price is too low. Most all producers — except Amoco, of course — say that 19¢/lb. is a much more reasonable price.

And Henry Reichhold points to a situation that, in his opinion, is likely to force all producers to adopt the 19¢ price level by fall. He notes that imports of naphthalene have been dropping as European nations — particularly Germany and Russia — increase their own PA production (*CW*, May 9, p. 95). And while the domestic naphthalene supply has been ample, largely because of high output in the steel industry, it's probable that steel and coke production will decline somewhat after the steel labor crisis is passed.

At that time, Reichhold figures, it's a fair bet that naphthalene will be selling for more than the present 5¢/lb. price — and phthalic makers will have to adjust prices accordingly.

Russia's New Equipment Shopping List

Product	Capacity or Cost
Polyacrylonitrile fiber and semiproducts	15,000 tons/year
Rayon tire-cord fiber, high tenacity	50 tons/day
"AH" salt (intermediate for nylon-66)	—
Helium (from natural gas)	—
Germanium processing (two units)	—
Nylon-6, continuous polymerization	12 tons/day
Carbon bisulfide recovery and regeneration	70 tons/day
Polyester resin for glass plastics	5,000 tons/year
Styrene copolymers	5,000 tons/year
Tripolyphosphate	—
Pyrophors	—
Acetate silk	5,100 tons/year
Activated carbon black (from liquid raw materials)	—
Plastic fabricating equipment	100 million rubles
Fatty alcohols, synthetic (two units)	5,000 tons/year
Alkylamides of synthetic fatty acids	5,000 tons/year
Synthetic fiber spinning, weaving, finishing	80-100 million rubles
Styrene and shock-resistant polystyrene	20,000 tons/year
Phenol-formaldehyde resins	30,000 tons/year
"Glass plastic" resins	20,000 tons/year
Nylon-66 intermediate and polymer	10,000 tons/year nylon
Acetate staple	20,000 tons/year
Polyvinyl chloride resin	35,000-40,000 tons/year
Tetrafluoroethylene	3,000 tons/year
Synthetic glycerine	20,000 tons/year
Ethylene urea	1,000 tons/year
Cellulose and board	200-220 million rubles
Newsprint (two units)	340 tons/day

Plugging 7-year Plan Gaps

Great Britain's Board of Trade released last week the list of machinery and equipment Russia would like to buy under the new Anglo-Soviet five-year trade agreement (*CW Business Newsletter*, May 30).

More than half the list is made up of equipment needed to plug holes in the Soviet's chemical industry development plans (table, above). Altogether it calls for "possible imports" from Britain totaling about \$1 billion during the 1960-64 period. In addition, the Russians have told the Board of Trade they also plan to buy about \$800 million worth of raw materials.

The purchases could triple British exports to Russia, according to Board of Trade President David Eccles. But

since they totaled only \$66 million (plus \$80 million in re-exports) last year, Anglo-Soviet trade would still be at a comparatively low level.

The Russians are not likely to get all the equipment they want. Some of it is probably on the Western allies' strategic goods embargo list.

And credit is still a major snag. The Russians refuse to use their gold supply for the purchases. And the British government will not extend direct credit. Indirect credit in the form of export credit guarantees is not large enough to cover the potential orders. But it may be expanded under pressure from British businessmen. And commercial banks in London may also lend a hand.

Sales Gain for Pfizer

The current chemical boom will help push Chas. Pfizer's six-month sales up by some 15%, company President John McKeen told the New York Society of Security Analysts last week. Profits, however, will just about hold their level of first-half '58, because of weak prices for penicillin, streptomycin, bulk vitamins and steroids.

The greatest rise came from "a remarkable upsurge" in chemical sales, McKeen said. Ethical drug sales are about on a par with last year's, with gains in new products balanced by the sagging broad-spectrum antibiotics and the other old-line lagers.

Fruits of Research: This year, Pfizer plans to spend some \$13 million on research, \$5 million more than in '57. One of the company's brightest hopes is Niamid, a metabolic regulator which has been in the labs for some eight months. Last fortnight it won government approval for application in mild and severe depressive conditions.

By the time the new drug hits the market (probably in about two months), McKeen hopes to get clearance on some other applications. Tests, he told the analysts, have shown it effective in reducing anginal and cancer pain, in severe asthmatic and alcoholic conditions, and for stimulating appetite.

Pfizer's newest research area is diuretics. Clinical tests of several products have just been launched, but none have been evaluated.

Booming Abroad: A good part of Pfizer's sales upbeat this year will come from its overseas operations, John Powers, head of Pfizer International, predicted. Powers expects '59 foreign sales will register one of the biggest gains in the past eight years.

Part of this will come from its recently acquired Kemball-Bishop fine-chemical house in England, and from the Dumex pharmaceutical companies of India, Pakistan and Ceylon, in which it picked up controlling interest last fall.

But sales are up all over the world, with operations in Great Britain, northern Europe and South America leading the way.

"Our strong sales position," Powers asserted, "is due to one thing — producing abroad." Pfizer now produces

in 18 countries, has wholly owned plants in 10. Another plant will soon start up in Colombia. Most are pharmaceutical plants, but Pfizer also makes basic chemicals in Great Britain, France and Japan, and will soon be producing in Argentina and Brazil.

By the end of this year, Pfizer will have carried out at least 75% of its \$35-million, 2½-year international building program, and plans to cut expenditures back sharply in '60.

Chemicals Pace 3M

Chemicals are paving the way toward a substantial boost in earnings for Minnesota Mining & Mfg. That's the view 3M President H. P. Buetow revealed to San Francisco security analysts.

Pointing up the growing role of chemicals in the company's plan, Buetow said one of this year's major projects is a \$5-million plant, primarily to make fluorochemicals.

The company's first-quarter earnings were 78¢/share — with chemicals contributing a major part of the profits. For all of '59, Buetow predicts an after-tax net of about \$52 million.

Chemicals Setting the Pace: Though the company doesn't break down quarterly sales according to product groups, Buetow did reveal that chemicals were the biggest sales gainers during the first quarter. He said that chemicals are running 43% ahead of last year's first quarter—the best showing of any 3M product group.

Directors have just okayed plans to spend the money for 3M's new fluorochemicals plant, hope to settle on a site by August. Ideally it will be located on a waterway, near inexpensive power. Good bet: somewhere in the Southeast.

For Treating Textiles: Among the most successful fluorochemicals this year, reports Buetow, is a fluorocarbon product tradenamed "Scotch Gard," used to impart stain and water resistance to wool and synthetics. Its sales are up 40% over last year, and are still on the rise.

In the same field is a modified fluorocarbon for treating cotton goods. It's now being evaluated in cotton mills, is expected to get heavy usage if treated cottons find a good market in next spring's dress lines.

Soon: Plastic Barges?

Imperial Chemical Industries has just put the Dracone, a flexible plastic barge, through its first deep-sea trial, hauling 40 tons of liquid hydrocarbons more than 500 miles on the rough North Sea. Result: ICI says transportation of chemical cargoes in these bags is now "entirely practical."

In the joint venture, ICI and Dracone Developments Ltd. loaded the sausage-like craft with liquid hydrocarbons at the ICI wharf on the River Tees, hauled the bag to Flushing, Holland, and back, discharging the cargo into rail tankers. An oceangoing tug towed the bag at an average speed of 7 knots, reported that steep seas up to 9 ft. in height didn't seem to trouble the *Dracone* at all. The flexible barge easily lumbered over and through the wave crests. The rough seas threw the tug around much more than they disturbed the barge.

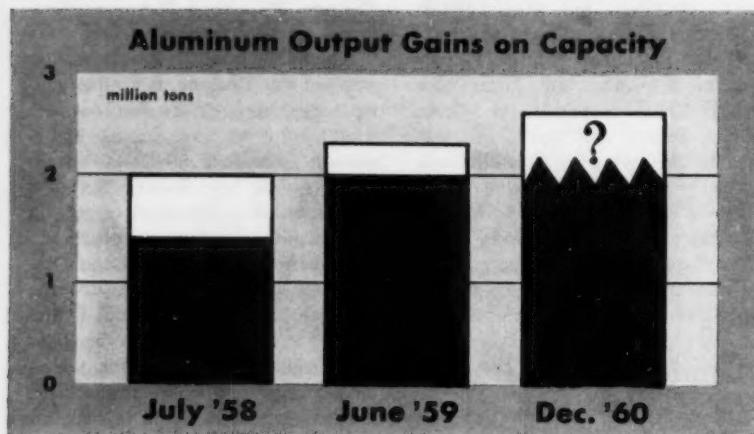
"We seem to have most of the problems licked now," says H. G. Hasier, Dracone operations manager.

ICI exports large tonnages of petrochemicals, notes that many of its lighter-than-water liquids could be transported in these flexible plastic barges. Among them are acetone, iso-octanol, isopropyl and isobutyl alcohol. ICI will continue experimenting with this unusual method of transporting liquid chemicals.

Coming Along: Interest in flexible barges has grown rapidly since their development at the time of the Suez crisis in 1956, when Britain's oil supply was threatened (*CW*, Oct. 4, '58; March 29, '58). Reason: low initial cost, coupled with very low towing costs. The bags offer savings to both large and small chemical shippers. In the large sizes, the bags cost less than one-fifth that of conventional steel tankers. And smaller shippers benefit by being able to use low-cost water transportation.

The *Dracone* used in the trial had a woven nylon skin, 0.15 in. thick, proofed inside with oil-resistant acrylonitrile-butadiene rubber, and outside with neoprene for abrasion- and weather-resistance. A tailfloat with an acetylene light warned other shipping of her location.

The successful sea tests show convincingly that flexible barges are on their way to a more significant role in chemical shipping.



Bright Aluminum Outlook

Aluminum producers are riding a sales groundswell that may carry total '59 deliveries 30% above last year's level. In the last few weeks, Alcoa, Kaiser and Reynolds reopened idle potlines, raising the industry's operating rate to more than 87% of its total 2.3-million-ton/year capacity.

And in July, Anaconda will boost its primary output from 75% to 88% of capacity. Just a year ago, the industry, caught in the cross currents of a recessionary sales slump and expanded capacity, was operating at only 70% of its then-available 2 million tons/year.

The most dramatic sign of aluminum's upsurge was Reynolds' decision to reopen potlines at Lister Hill, Ala., and Jones Mills, Ark., boosting operations to 100% of its 601,000-ton capacity.

Earlier, Kaiser had opened the fourth potline at Ravenswood, W. Va., bringing this plant up to its full 145,000-ton capacity. Kaiser then added another 22,000 tons of actual production by reactivating a potline at Mead, Wash. The moves brought Kaiser's operating rate up to 86%.

And Alcoa — to feed the swelling demand of its local fabrication operation — reopened the long-idle potline at Alcoa, Tenn., boosting the company's total operating rate by 10,000 tons, to about 83%.

The current operating paces of the "Big Three" reflect the tone of optimism that pervades the aluminum industry. Twelve months ago, Reynolds was operating at only 72.7% of

capacity; Kaiser, at 71%; Alcoa, at about 70%.

In general, the sales pickup reflects an across-the-board strengthening of markets. A minor part of the gain is attributed to spotty hedge-buying, prompted by the looming steel strike and, more remotely, by talk of an upcoming aluminum price rise. The major producers, however, place the greatest weight on the generally healthy market. They underscore their optimism by stating that government purchases this year will total only about 50,000 tons, compared with almost 350,000 tons in '58.

Kaiser attributes its cheery second-quarter outlook (sales are expected to go over a record \$100 million, compared with second-quarter '58 sales of \$98.5 million) to increased demand in all market areas; Alcoa finds the sharpest rise in transportation and building, with some increases in the electrical and consumer durables industries. Olin Mathieson reports a "very sharp" pickup in orders from the building, auto, communications and electrical industries. Says Reynolds: "A substantial portion of the new demand is due to increased production of end-products. Many of our customers do not have as much excess as anticipated. They keep on selling, and we keep producing."

Problems Ahead: Just how long this upswing will continue uninterrupted is far from clear. Aside from general business conditions, foreign competition will probably have the most important impact. Although the quantity

of low-priced foreign material coming in is relatively small, U.S. producers contend it has a "disrupting effect" on prices.

One company spokesman, in fact, calls the threat of foreign competition "the biggest cloud over the aluminum industry today."

So far, most of the impact of imported material — which comes mostly from western Europe in finished and semifinished forms — has been felt on the East Coast. But the St. Lawrence Seaway opens a route for invasion of the Midwest.

How severe foreign competition becomes may depend in part on whether the expected domestic price rise materializes and, if it does, on how steep it will be.

Producers have been guaranteeing steady prices since January for the period through the termination of current labor contracts, which end July 31. A wage increase is a good bet — and aluminum prices have usually followed the wage pattern.

"A small price increase is definite," one producer told CW. Other producers won't make firm predictions, but all insist that current prices are "too low." First-quarter profit dips bear this out. Compared with the '58 quarter, Alcoa's sales were up 4.4%, but profits dipped 7%. Reynolds' profits slipped 9%; Kaiser's, 45.3%.

But if prices do go up, one official believes, it will probably result in increased pressure from foreign material, as well as from competing metals. This could be especially true in "fringe" areas, where, because of shipping distances, aluminum's cost advantage over steel is diminished. And the problems in these areas may be further intensified by the new pricing policy, which is based on delivered price, instead of f.o.b., with freight costs deducted — a system that sometimes resulted in hidden discounts.

But the threat of foreign competition doesn't dim the long-term optimism of U.S. producers. The solution, they believe, will lie in raising the per capita consumption of aluminum in foreign countries closer to that of the U.S. — some 21 lbs./year. In western Europe and Canada it is only about 6 lbs./year, Alcoa President Frank Magee points out, and only about 0.7 lb. in the rest of the world. Boosting these levels would easily soak up all the capacity in sight.



Enjay's Tracy warns MCA against exporting know-how to Russia.

Spotlighting U.S. Security

The chemical industry's role in bolstering national security is of increasing concern to management. This was demonstrated late last week at the Manufacturing Chemists' Assn.'s 87th annual meeting held in balmy weather at White Sulphur Springs, W. Va. Attendance: 862, a new high.

Underscoring the delegates' growing wariness of the Soviet Union's economic and technological challenge were warnings issued by two of the speakers:

• In a strongly worded speech opposing disclosure of U.S. industry's advanced processes and equipment (see p. 36) to the U.S.S.R., Enjay President Osgood Tracy declared, "Trade is mainly a weapon of political warfare to the tough-minded rulers of the Kremlin (*CW Business Newsletter*, June 13). . . . There is a deadly iron fist hidden in this velvet glove of so-called 'peaceful trade'."

• Princeton chemistry Professor John Turkevich — winner of one of MCA's past awards for teachers — called for continued all-out support of

the association's aid-to-education program, because of its value in helping the U.S. in the East-West race for technical know-how.

Investing for Peace: Still another aspect of the national security problem was stressed by Milton Eisenhower — president of Johns Hopkins University — who delivered the principal speech at the Friday evening banquet that closed the two-day meeting. The educator — who previously served as special ambassador to Latin America, on a major assignment for his brother, President Dwight Eisenhower — urged that U.S. companies increase their business contacts with Central and South American countries, through both trade and capital investment. He said this can be justified in terms of potential for private profits as well as on the grounds of public policy.

"The Russians," Tracy charged "are buying machinery and specialized processes only to copy them—and I don't think we can do much 'repeat business.' The Europeans aren't trad-

ing.' They are subsidizing their competitors with advanced machinery." He said the U.S. should urge its allies to reject deals that would build up Russia's industrial machine.

CW's spot-check of various delegates showed hearty backing for Tracy's stand against exporting of technology to Russia. And General John Hull — who was re-elected to his fifth one-year term as MCA's full-time president — revealed that the association has budgeted more than \$165,000 to carry out its aid-to-education program in the coming year. This program, Hull told delegates, "is one of the most exciting and worthwhile enterprises in which we are engaged."

Connor Succeeds: Delegates chose Merck President John Connor to serve as MCA chairman for the year ahead, succeeding Union Carbide's Harry McClure. New chairman of the association's executive committee will be Du Pont Vice-President David Dawson.

Also at Thursday's business session, various committees reported: progress in MCA's industry public relations program; establishment of a legal advisory committee; a treasury surplus equivalent to about six months' budget.

Spencer Chemical Co. (Kansas City, Mo.) and J. T. Baker Chemical Co. (Phillipsburg, N.J.) received the coveted Lammot du Pont safety awards; and six college and university chemistry instructors each received a medal, citation and \$1,000 check as winners of MCA's teaching awards (*CW*, May 16, p. 37).

Sun and Fun: For the greater part of the two days — between Thursday morning's business session and Friday evening's banquet — delegates took advantage of the opportunities for sun, fun and relaxation. There were golf, tennis, skeet shooting, swimming and a Monte Carlo party at which each participant received an initial stake of \$10,000 — in "play money."

But behind the facade of relaxation was a serious undercurrent of shoptalk discussions, many of which will likely be reflected in future industry decisions.

After it was all over, a number of MCA delegates changed badges and stayed on for the annual convention of the National Plant Food Institute, which followed MCA at the Greenbrier.

COMPANIES

International Minerals & Chemical will consolidate its three top divisions into a single Agricultural Chemicals Division. Last fall, the phosphate minerals and phosphate chemicals operations were merged into a phosphate division. Now, starting July 1, the phosphate and potash divisions will be joined.

Foster Wheeler Corp. will not be acquired by North American Aviation, as had been planned. Talks, under way since April, were ended "in the mutual conclusion that the mutual benefits originally expected from the merger would not be realized."

Thiokol Chemical Corp. and **Marquardt Corp.** are two other firms that have called off merger plans. The two companies collaborated on the Bomarc missile, which recently made its maiden flight.

American-Marietta Co. has acquired Marietta Concrete Corp. (Marietta, O.), producer of concrete storage silos, bins and precast structural components.

Strong, Cobb and Co. (Cleveland) and The Arner Co. (Buffalo, N.Y.), both custom pharmaceutical manufacturers, will merge. The new company will be called Strong Cobb Arner, Inc.

Food Machinery and Chemical Corp.'s fire at its Nitro, W. Va. Chemicals & Plastics Division plant did not disrupt shipments, although it destroyed half of the esterification building and material in process. The plant is using spare production equipment.

Electric Reduction Co. of Canada has purchased the phosphatic fertilizer plant of Dominion Fertilizers Ltd., at Port Maitland, Ont. It will be linked up to a multi-million-dollar chemical project that Electric Reduction plans to build in the Port Maitland area.

EXPANSION

Phenol, Cresol: Northwest Petrochemical Corp. (Vancouver, Wash.) will build a phenol-cresol recovery plant and refinery at Anacortes, Wash., adjacent to Texaco and Shell refineries. It will use by-products from Puget Sound-area refineries, will supply plywood and adhesives producers and other Pacific Northwest industries.

Resins, Adhesives: Armour & Co. is putting up a \$250,000 plant in Philadelphia to blend and package chemical resins and adhesives.

Vegetable Oil: Western Canadian Seed Processors Ltd. has awarded Chemetron Corp.'s Girdler Division a contract to engineer and equip a \$1-million vegetable

oil-processing plant at Lethbridge, Alberta. It's part of a \$4-million project, which includes a seed cleaning and processing unit and a solvent extraction plant.

Alkyls: Texas Alkyls has broken ground for a \$1-million, 1-million-lbs./year aluminum alkyls plant in Houston and is considering building a larger, broad-range alkyls plant on the Houston Ship Channel.

Vinyl Flooring: Two vinyl flooring expansions are on tap in Ohio. Johns-Manville has awarded a contract for a multimillion dollar vinyl and asphalt floor tile plant near Chillicothe. And Goodyear will more than double its vinyl flooring and counter-top production at its Akron plant.

Petroleum: Signal Oil & Gas Co. is expanding capacity of its Bankline refinery at Bakersfield, Calif., from 8,000 to 15,000 bbls./day. Expansion will take six to eight months. Signal has also completed engineering for its new, \$40-million refinery, will build it either at Huntington Beach or on the site of its burned-out Hancock refinery.

FOREIGN

Vinyl Acetate/Mexico: National Starch and Chemical Corp. has purchased Polimeros S.A. (Mexico City), which has been producing vinyl acetate polymers primarily for the paint industry. National helped design the plant in '54 and licensed the manufacturing processes. It will now install additional equipment to make vinyl acetate polymers and copolymers, and adhesives.

Petrochemicals/Germany: Rheinische Olefinwerke (Wesseling), Germany's biggest petrochemical producer, has unveiled a new expansion program that will bring total investments to \$120 million by '61. By '62, annual capacity of the BASF-Deutsche Shell subsidiary will be expanded to 125,000 tons of ethylene, 100,000 tons of high-pressure polyethylene, 12,000 tons of low-pressure polyethylene.

Heavy Water/Germany: The new heavy-water plant being built at Griesheim for the German Atomic Energy Ministry by Pintsch Bamag A.G. will use a hydrogen sulfide dual-temperature exchange process, not an ion-exchange process, as previously reported. It's due onstream by the beginning of next year.

Nuclear Fuels/France: Sylvania-Corning Nuclear Corp. plans to purchase a share in Compagnie pour l'Etude et la Realisation de Combustibles Atomiques (CERCA), a nuclear fuels producer. CERCA's present owners: Saint Gobain, Pechiney, and Societe des Forges et Ateliers du Creusot (SFAC). Government approval must be granted before the deal can be closed.

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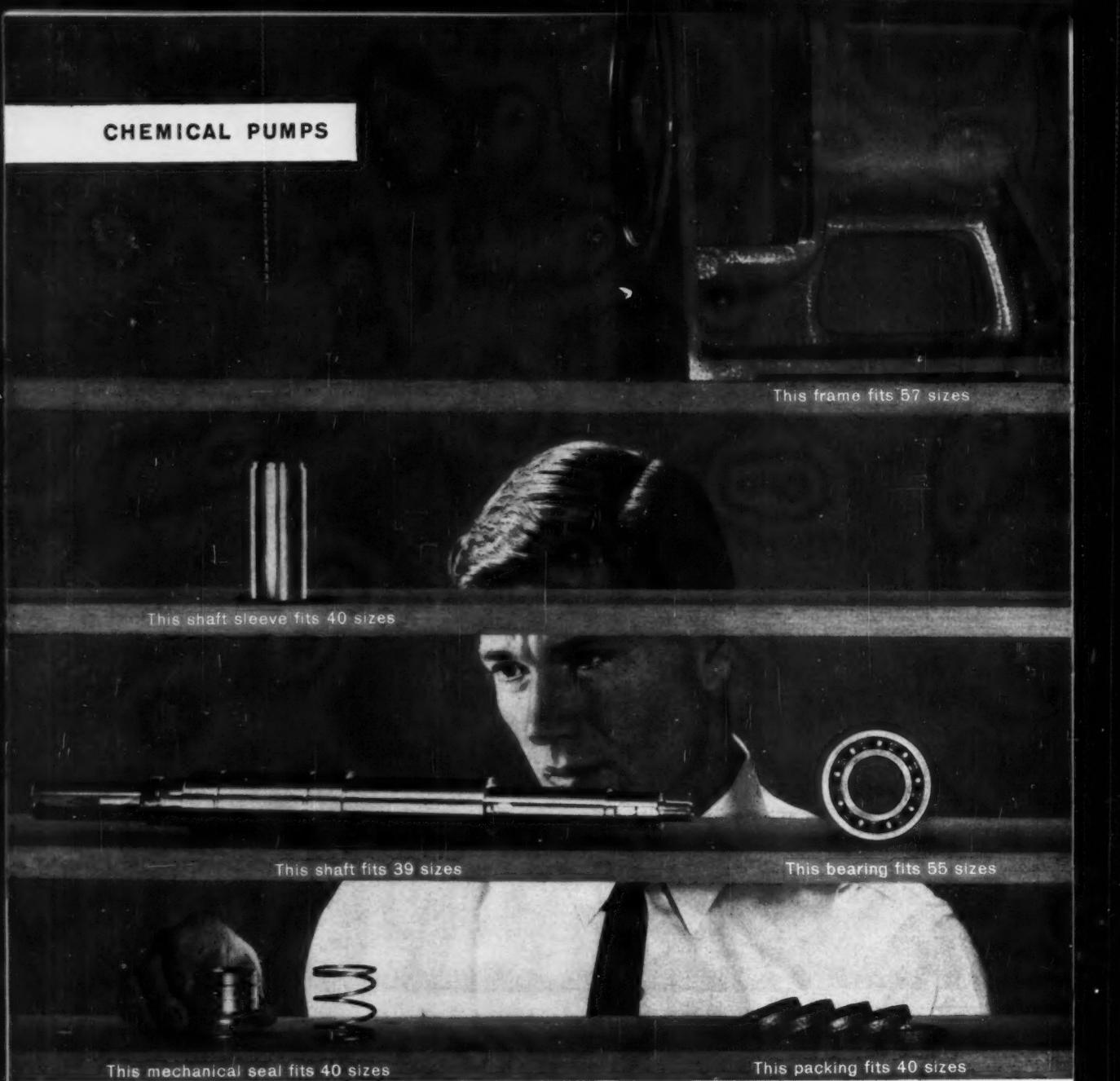


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WORTHINGTON

Washington Newsletter

CHEMICAL WEEK
June 20, 1959

The color additives bill is awaiting action by the House, but no committee hearings have been scheduled so far. The Food & Drug Administration hopes to get it through before Congress adjourns at the end of summer.

FDA Deputy Commissioner John Harvey attempted to explain one provision that has puzzled industry people—the exemption for additives generally recognized as safe. FDA feels it won't be sufficient that just a few scientists judge a substance as safe—they may have exclusive knowledge of an additive's use or the tests proving its safety.

Its safety must be generally recognized among pharmacologists, physicians, biochemists and others qualified to judge.

Employment in the chemical industries went up from April to May on a seasonally adjusted basis, although it went down in total numbers. In other words, while employment dropped for the month, it did not fall as far as usual for this time of year.

Employment dropped from 845,900 to 844,800; on a seasonally adjusted basis it went up from 841,000 to 850,000.

Petroleum, rubber and coal dropped in both total employment and seasonally adjusted employment. Seasonally, petroleum and coal were down from 239,000 to 236,000; rubber products from 243,000 to 233,000. Jobs in paper and allied products increased slightly and held about even on a seasonal basis.

The job market as a whole did well. Total employment in May increased 1,004,000—to 66,016,000—a new employment record for the second straight month. Employment is now 2 million above May '58—a good increase for any one-year period but not quite matching the one-year rise coming out of the 1953-54 recession.

Unemployment also dipped 238,000, better than seasonal expectations. Labor Secretary Mitchell calls this "exceptionally good," although government economists are more restrained.

The short view ahead: further improvements in employment will come harder now that the economy is rubbing up against the hard core of unemployed.

The new truck-size "toothpaste tubes" for shipping chemicals and other liquids or granulated products are causing a big fight in the trucking industry. Cheaper shipping rates for chemicals may be involved in the outcome.

The tube is a giant rubber-and-fabric "tank" produced by U.S. Rubber Co. The tank will carry 55 to 4,300 gal., can be hauled by an

Washington

Newsletter

(Continued)

open, flat or van-type truck. When emptied, it can be rolled up like a tooth-paste tube and stacked in one corner of the truck—making room for other goods on the return trip and hence offering potential savings. Tank truckers, who generally have trouble finding liquids for return trips, view it as a real threat.

The tank truckers want exclusive rights to haul the tubes. Other truckers claim they have just as much right to haul them as to haul other types of containers like metal drums. The Interstate Commerce Commission has just completed hearings and is now weighing a decision.

Output and use of sulfur in '59 will likely be up about 15%, compared with '58, and may approach '57 levels, says a Commerce Dept. report. Consumption of end-products is expected to increase for all major uses and exports will hold even at about 1.5 million tons.

Sulfuric acid production and consumption in the first quarter indicate a record year in the making, particularly if the summer months hold relatively high. This will depend greatly on steel and autos.

New regulations on use of veterinary drugs ban any carcinogenic materials that might leave a residue in the meat. But it applies only to new-drug applications, with existing drugs exempt—at least for the time being.

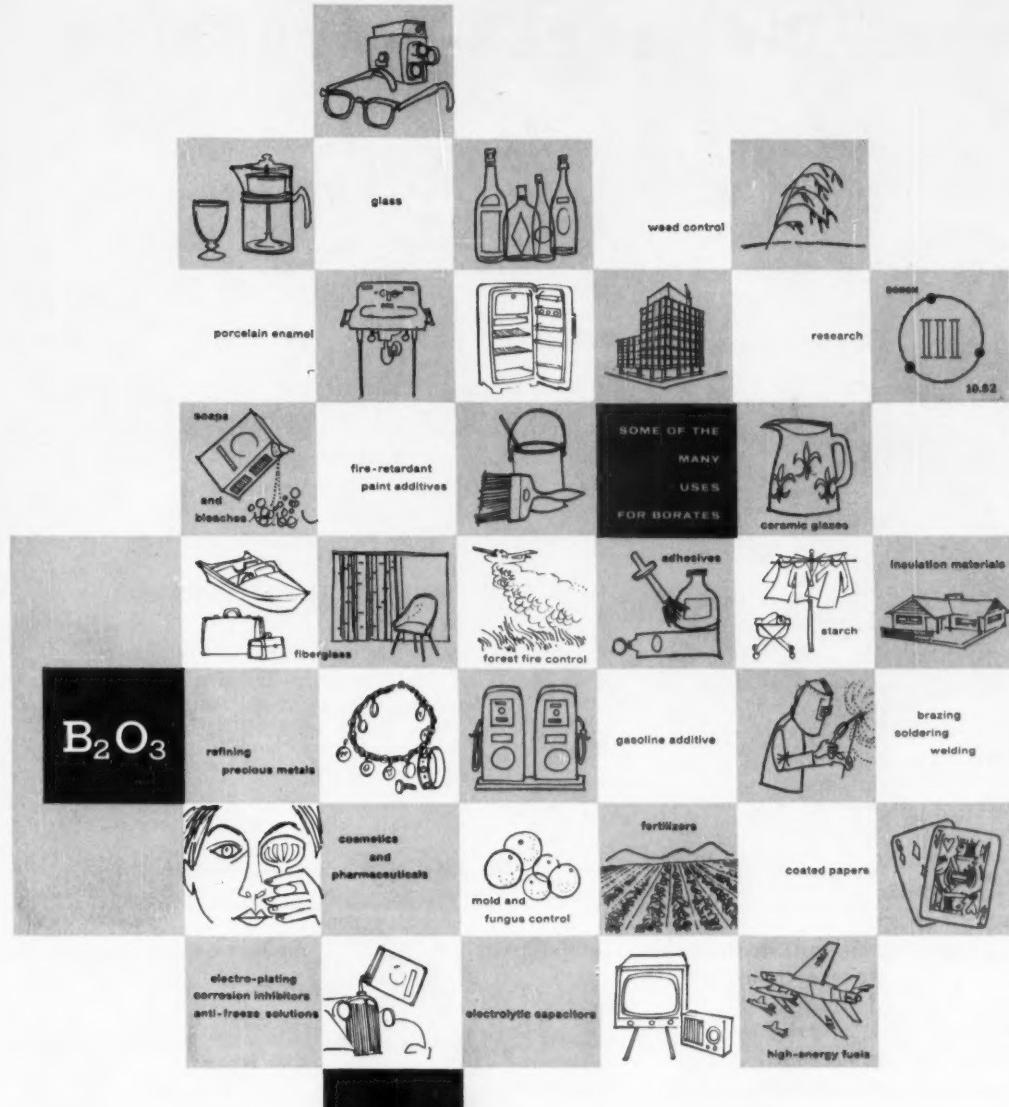
The bill doubling funds for water pollution control faces a veto. The President will reject it if the Senate passes it in its present form, which is likely. But proponents feel they just may have enough grass-roots strength to override a veto on this one.

The House-approved bill, described as a "budget-buster" by Republicans when it passed the House, would hike annual federal grants from \$50 million to \$100 million.

The number of college science students is increasing. This year, 10% more juniors enrolled in science and mathematics than were enrolled last year.

But enrollments as chemistry majors went up only 3%—the same percentage increase as the class as a whole. Math took the big jump—31%. This will mean 45,000 bachelor degrees in science and math in June '60, compared with 37,000 in June '58.

AEC's plans for testing peaceful use of nuclear explosions are shaping up. A 10-kiloton bomb will probably be set off in Canada's oil-rich tar sands next February. It now appears that chemical and oil companies may be willing to pay half the cost of a series of experimental blasts in Colorado next spring. They will be designed to break up oil shale, render it susceptible to underground retorting and eventual production of crude.



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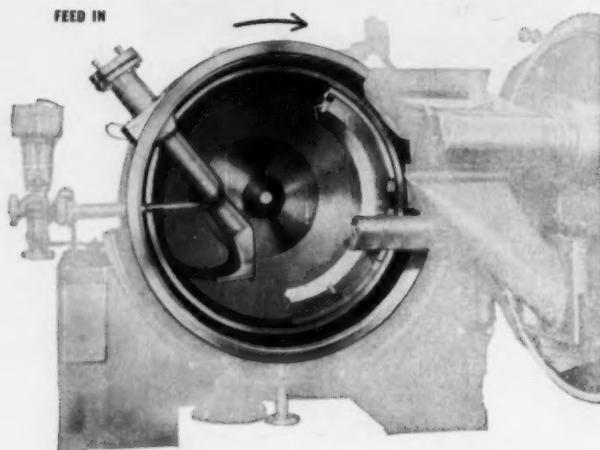
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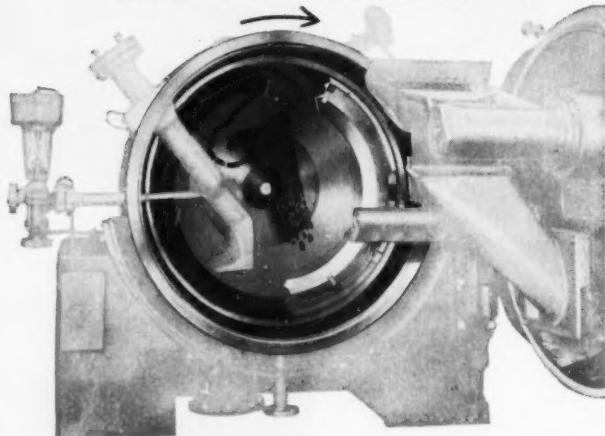
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PRODUCTION



CW PHOTOS—PAUL LONGIN

Lab supervisor, James Cullen, talks about sampling techniques to chemists at National Lead meeting.

The Control Chemist Speaks His Mind

If honeymooners at sleek, modern Treadway Inn overlooking the Niagara River took time recently to notice the group pictured on these pages, they might have thought they were looking at conventioners. But for the 30 chemists in the group, now back at National Lead Co.'s many plant laboratories, the occasion was purely business. A two-day-long company-wide meeting attests to the growing importance the company is attaching to the control chemist's role.

Most plant control chemists don't often have their "day," but National Lead's annual two-day symposium on analytical and physical testing methods is designed specifically for the plant chemist.

Although researchers attend and take part in the meetings, more than half of the papers are given by control chemists. And all the papers con-

cern existing or proposed control techniques.

"We have so many company divisions that we must make a special effort to acquaint the various chemists with divisions they don't work in. And, while the test methods are often peculiar to certain divisions, ideas are readily borrowed," according to Roy Dahlstrom, National Lead Co.'s research director. Sometimes the chemists find they have much in common. For example, at the Niagara Falls meeting, chemists from three of the divisions found that each was running the same test, but with different standard test solutions. They'll now determine which standard solution is most advantageous.

The information interchange is also helpful to the researchers. "While researchers are sometimes able to contribute useful information at the meetings, the plant chemists contribute

more in the nature of experience with plant testing methods. Our job is to develop new test methods. The plant chemist is the key to their successful use by the plant. He's the one who really determines whether the methods are practical," says Edward Scheffer, research supervisor of the Titanium Division's analytic department.

Born in Division: The meetings were begun by the Titanium Division nine years ago on a divisional level. Because of their value as a communications tool, they were gradually expanded to an annual company-wide event. To make the event more functional, the company will hold it at a different location each year.

Prior to last year, meetings were held at the Titanium Division's Sayreville, N.J., plant. Last year, sessions were switched to the Doehler-Jarvis Division's Toledo plant. This year, for the first time, the symposium wasn't

PRODUCTION



Scheffer, in on previous meetings, helped Titanium Alloy set up program.

held in a plant, although on the second afternoon, the chemists toured the Niagara Falls laboratories of the Titanium Alloy Manufacturing Division. "It's important that the chemists get to see the facilities of the different divisions," says Holback. The first day's dinner and evening session were attended by many Titanium Alloy chemists and researchers.

By changing the site each year, not only do chemists have the opportunity to visit different facilities but also chemists at different locations have a better chance of attending.

Possible site of next year's meeting is Texas. While chemists went to Ni-

agara from as far away as Henderson, Nev., this year, it was a little too far for representatives from the West Coast, says Dahlstrom.

Picking Papers: A main reason for attendance by the Henderson staffers this year was their presentation of a paper on statistical techniques to determine optimum test conditions and procedures, and to establish and maintain test tolerances.

Requests for papers are sent out several months in advance by the meeting's hosts — this year by Steve Urban, director of research, and Karl Traub, director of quality control of the Titanium Alloy Manufacturing Division. Urban and Traub, as dual hosts, preserved the cooperative researcher-control chemist atmosphere that has been important to the success of the meetings.

"We try to limit the subjects of the papers to areas that will be of interest to everyone, even though we have so many diverse activities within the various divisions," says Urban.

"We've certainly had no trouble in obtaining papers so far," adds Scheffer, whose experience in conducting earlier meetings for the Titanium Division helped him in his role as program chairman.

Story List: This year's subjects included: colorimetric and polarographic analysis; electron-microscopy, infrared, emission-spectrographic and X-ray techniques; and statistical quality-control techniques.

Last year's Toledo meeting emphasized papers on spectrographic tech-



Urban, co-host at meeting, heads Titanium Alloy's research labs.



Traub shared host duties with Urban, directs Alloy's quality control.

niques because host Doehler-Jarvis had particular interest in the subject.

"Outside of various society meetings, this meeting gives the chemist one of his few opportunities to present technical papers," says Dahlstrom. "No complicating clearance restrictions are placed on the preparation of papers for society meetings." If a chemist wants to have his paper published after the meeting, he is free to do so, once proper company clearance has been obtained, he adds.

The meeting does not eliminate the exchange of information by reports. It complements and supplements the everyday methods of information exchange. "It's much easier to listen to papers than to read through them," says Scheffer.

While the meetings aren't inexpensive, National Lead concludes, the communications bonus has proved more than worth the expense.

Eye on Fluorides

Fluorides, which have a bad reputation as air pollutants (*CW*, Dec. 14, '57, p. 75), will come under study by Washington State College (Pullman, Wash.) in conjunction with the college's development of the Mini-Adak automatic air-pollution detector.

Objectives of the study, sponsored by the U.S. Public Health Service, are to determine the reaction of the analyzer to fluorides and to recommend the best method of separating fluoride pollutants from the air.

Donald Adams, head of the air-pol-



Chemists relax with afternoon coffee on patio overlooking Niagara River.



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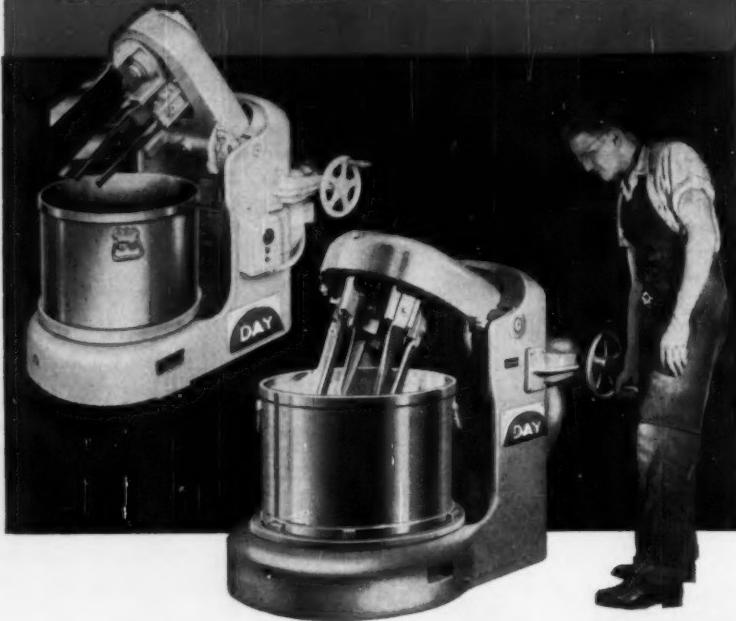
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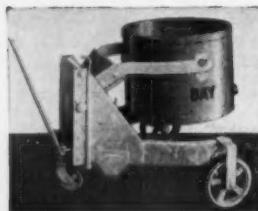
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lution section of WSC's division of industrial research, says the \$16,500 USPHS grant for a two-year study allows resumption of work that was discontinued two years ago for lack of funds.

The Mini-Adak is a portable version of a previously developed WSC instrument that measures the color changes produced in the unit's reagent by the pollutant in the gas sample.

EQUIPMENT

Bulk Feeders: Syntron Co. (Homer City, Pa.) has a new line of overhead-magnet, high-capacity, bulk-material feeders. The feeders are vibrated electromagnetically 3,600 times/minute, feature instantaneous starting and stopping of feed.

Gas Cleaner: The Blaw-Knox Type M-P Gas Cleaner is a new unit designed to provide more phases of scrubbing and separation — to remove dust and oil — than previous types. Manufacturer Buflovak Equipment Division, Blaw-Knox Co. (P.O. Box 2041, Buffalo 5, N.Y.), says improvements in the new unit stem from four scrubbing phases, six liquid-separation stages and internal control of the amount of scrubbing medium in circulation in proportion to the gas flow. Dust removal efficiency is the same at high and low flow rates; the unit can be used on systems with widely fluctuating compositions. The cleaner is said to remove virtually all particles down to 2-3 microns in diameter, 80% of those in the submicron range. Unit sizes range from 18-72 in. in diameter, handle up to 18 million standard cu.ft./hour of gas.

Process Controller: A simplified version of its line of slope-controllers is a new offering of Quarie Controllers (Canton, Mass.). The new controller — called the Maximizer, Model 760-W — controls only for 'zero slope,' giving a choice of a maximum or a minimum. Each controller is designed to control one process, provide a single output. Control action is intermittent because the process must be allowed to stabilize after a change. Stabilization times are adjustable over any 10:1 range with a 30-second minimum.

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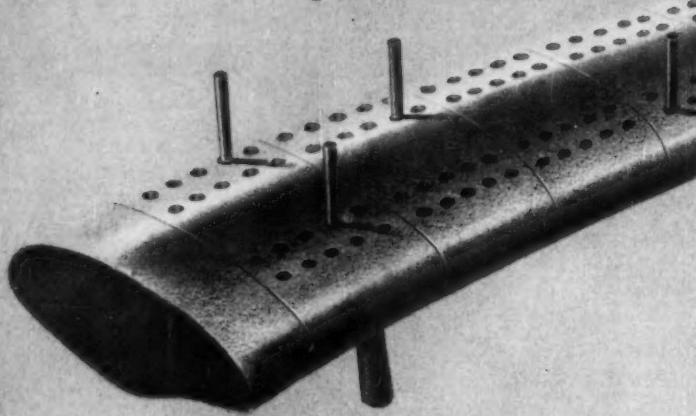
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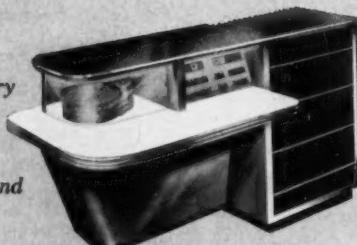


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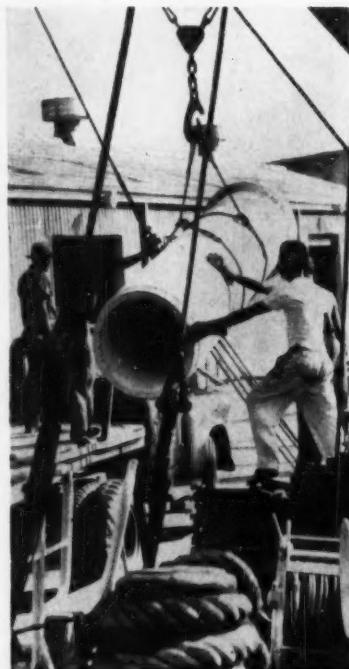
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PRODUCTION

(Santa Fe Springs, Calif.) has a new unit for making automatic corrosion measurements, the Model L-2 Corrosometer. The L-2 is said to be capable of detecting as little as one millionth of an inch of corrosion on a routine basis, down to one billionth of an inch in special applications. Readings are continuously recorded on a chart. A single unit can be used to monitor up to 12 separate tests, with a recorder added for each different test.

Air-Flow Switch: The Powers Regulator Co. (3434 Oakton St., Skokie, Ill.) is out with a new selector switch for stopping or diverting compressed-air flow to instruments, valves,



Concrete Ore Carrier

These stevedores at Moa Bay, Cuba, unload a section of 24-in. concrete pipe intended to solve the ore-carrying problem at Freeport Sulphur Co.'s subsidiary, Freeport Nickel Co. The pipe will move a 35% solids ore slurry 14,000 ft. downhill by gravity flow from the mining site to the nickel-cobalt ore leaching plant at the rate of 8,450 dry tons/day. Pipe was supplied by Vulcan Materials Co. (Birmingham, Ala.); the plant is due in operation later this year (*CW*, Oct. 18, '58, p. 60).

ALL 5 GRADES OF ETHYL ALCOHOL FROM CSC

ROSSVILLE HEXAGON *Cologne Spirits*

Specially fractionated grain spirit. Finest quality — unsurpassed in purity, clarity and freedom from foreign odor. The choice for the finest perfumes, colognes and toilet waters. Available at 190 proof, pure or specially denatured.

DENATURED

CSC makes available the more than 50 formulas of specially denatured alcohol authorized by the Bureau of Internal Revenue. These are usually prepared from 190 proof ethyl alcohol but anhydrous formulas are also available. All authorized formulas of completely denatured alcohol also available—either anhydrous, 190 or 188 proof.

PROPRIETARY SOLVENTS

Shellacol®, Quakersol® and Fotocol® and CSC's line of alcohol-type solvents. They possess the valuable solvent properties of the completely denatured alcohols and at the same time offer the additional advantage of mild odor and freedom from objectionable characteristics. Individual data sheets for each of these products are available.

ROSSVILLE **algrain®**

Highly refined grain alcohol. Free from foreign odor and flavor. Meets the most rigid standard of purity. Recommended for use in medicinals, perfumes, toilet waters and flavoring extracts. 190 proof, pure or specially denatured.

ROSSVILLE **GOLD SHIELD®**

Quality-control process assures uniformly high purity and freedom from foreign odor and flavor. Because of this, Gold Shield is widely used for industrial, scientific, pharmaceutical and cosmetic purposes. Available at 190 or 200 proof, pure or specially denatured.

ALL 5... and service too!

Get the type of ethyl alcohol you want . . . in the quantity you want . . . when you want it. Deliveries available in every quantity—tank car, tank truck, compartment tank car, drums or smaller quantities. Pure alcohol also available in pint, quart and gallon bottles. Behind all this a network of denaturing plants, sales offices and distribution points. In other words, all 5 grades and service too! Let us prove it to you.

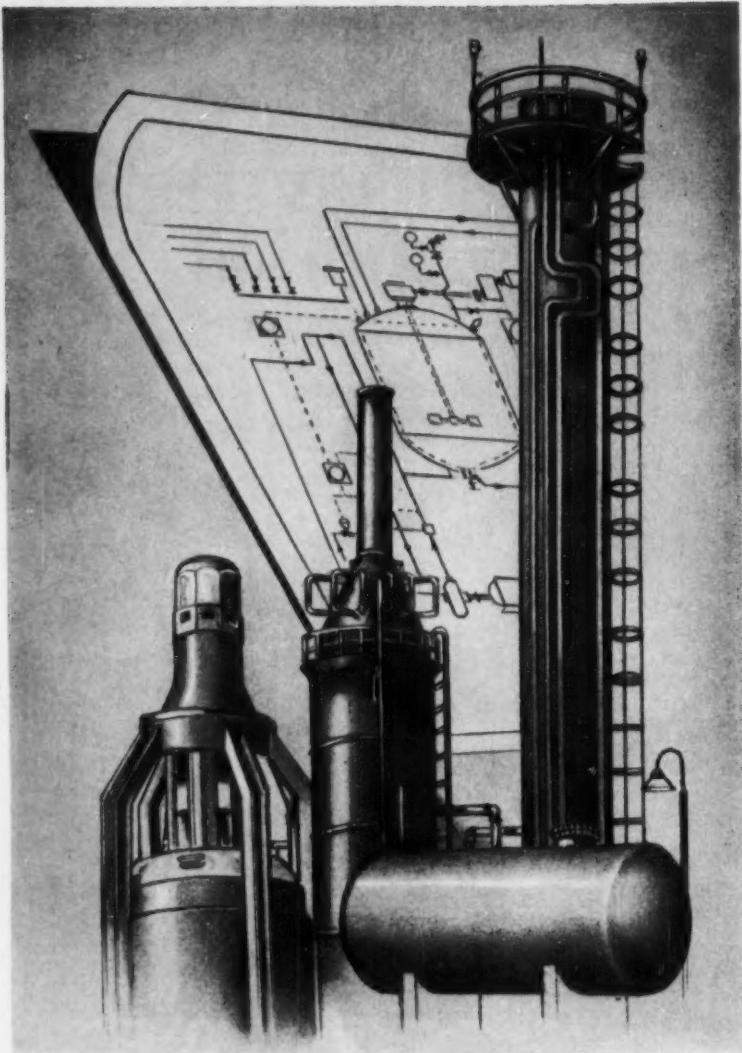


INDUSTRIAL CHEMICALS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

260 MADISON AVE., NEW YORK 16, N.Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Kansas City
Los Angeles • New Orleans • Newark • New York • St. Louis • San Francisco
IN CANADA: McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S. A., Mexico 7, D.F.



SILICONES AT WATERFORD

General Electric chose Crawford & Russell Polymer Plant Engineering service for the expansion of the Waterford, New York silicone resin and rubber plant.

Crawford & Russell serves many of the largest manufacturers of synthetic rubbers, resins, plastics, monomers and chemicals with a complete, confidential, economical engineering and construction service.

See us about your expansion plans

CRAWFORD & RUSSELL

INCORPORATED

STAMFORD • CONNECTICUT

PRODUCTION

dampers and pneumatically operated motors, and for changing air supply pressures in a system. A Teflon disc, which replaces a leather one in the switch body, reduces air leakage and friction. The switch is 10% smaller than previous models, requires $2\frac{3}{8} \times 3\frac{3}{8}$ in. of panel board space. The switch is $3\frac{1}{4}$ in. deep.

Incandescent Lamps: General Electric's (Nela Park, Cleveland 12) new line of iodine-cycle lamps, called Quartzline, are said to be the smallest, brightest and most efficient incandescent lamps produced. According to GE, the pencil-thin tubular quartz lamps are the first to successfully use the repeating iodine cycle principle. They are 200 times smaller than other lamps of the same wattage, maintain 99% of original light output throughout their life. The 500-watt lamp for general floodlighting operates on standard 120-volt power, produces 10,500 lumens, is $4\frac{1}{2}$ in. long. The high-voltage 1,500-watt lamp operates on 277 volts, produces 33,000 lumens, is 10 in. long.

Metering Pump: A new metering pump for corrosive chemicals is being manufactured by Milton Roy Co. (1300 Mermaid Lane, Philadelphia 18). It is designated Model CM, features plunger interchangeability and ease of field conversion from simplex to duplex type. Capacity: 28 gph. (simplex) and double capacity in duplex design. Pump pressure: 1,100 psi. Typical applications: metering dyes, corrosion inhibitors, glues, wet-strength resins.

Dissolver-Disperser: An improved high-speed dissolver and disperser is a new product of Charles Ross & Son Co. (148-156 Classon Ave., Brooklyn 5, N.Y.). The unit's millhead develops four different types of action instead of single action of previous impellers. Specially pitched impeller vanes draw material down into millhead where it is thrown at high speed against baffles to break down lumps. The material is then pumped through narrow orifice, sheared by teeth spaced around periphery of millhead and jetted into slower-moving material in the surrounding tank. Disperser can be used with containers ranging in size from 55-gal. steel drums to 40 x 45-ft. tanks.

makes difficult syntheses practical

BUTYNEDIOL



new intermediate

BUTYNEDIOL



From Research to Reality

Butynediol, a product of GAF's high-pressure acetylene chemical plant, has multiple centers of activity that open new synthetic routes to previously inaccessible compounds. It reacts as a glycol and a disubstituted acetylene. By trimerization, dimerization, and esterification, it forms cyclic compounds.

If you are interested in the development of agricultural chemicals, pharmaceuticals, electroplating chemicals, textile auxiliaries, or high energy propellents, Butynediol can be of great importance to you.

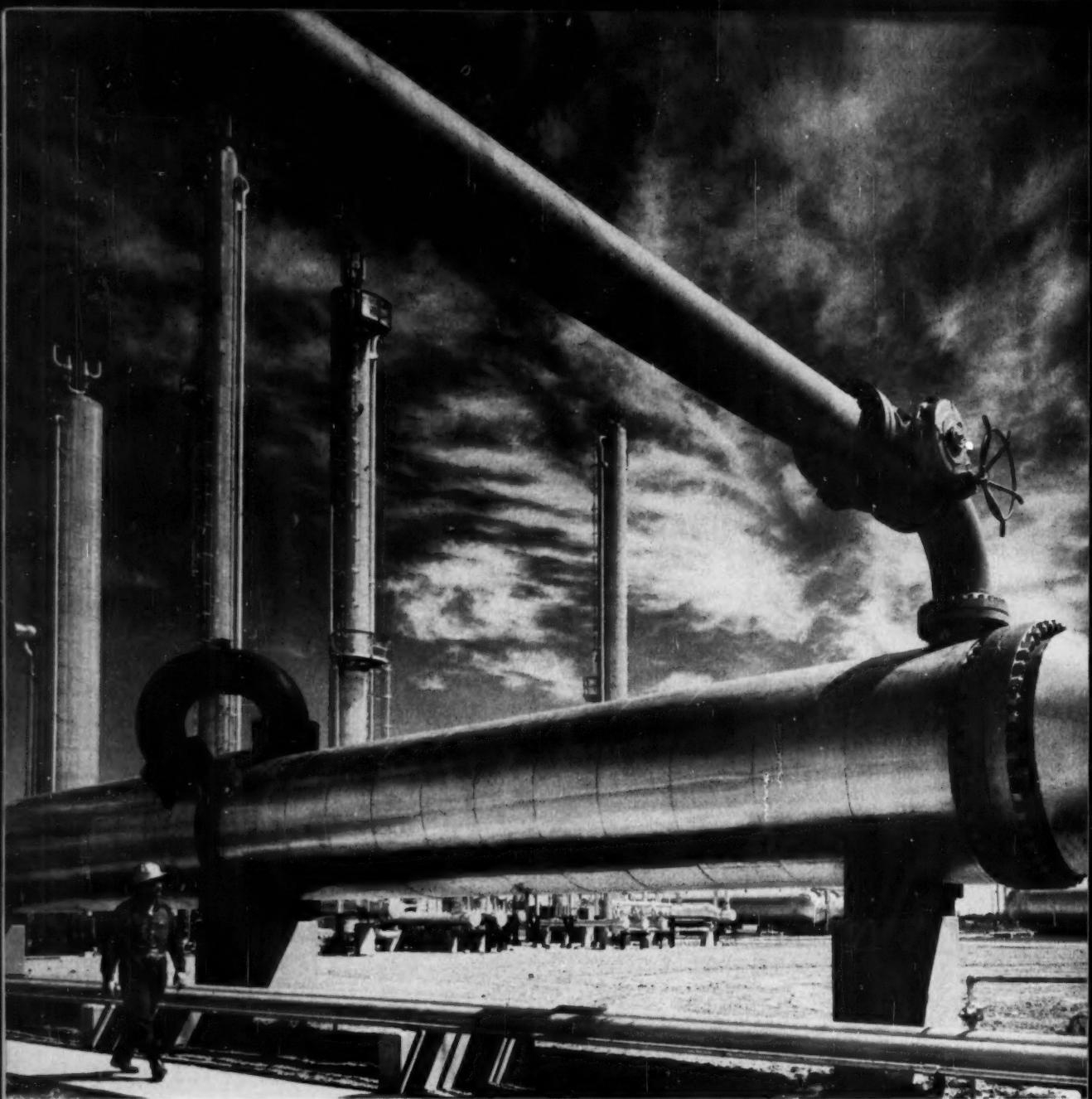
We have just printed a 44-page bulletin that describes Butynediol's physical properties, storage and handling, chemical properties and uses. You will find it full of the kind of information that stimulates new ideas. Write for it today.

From Research to Reality

ANTARA

gaf

ACETYLENE CHEMICALS DEPARTMENT
ANTARA[®] CHEMICALS
A SALES DIVISION OF
GENERAL ANILINE & FILM CORPORATION
446 HUDSON STREET • NEW YORK 14, NEW YORK



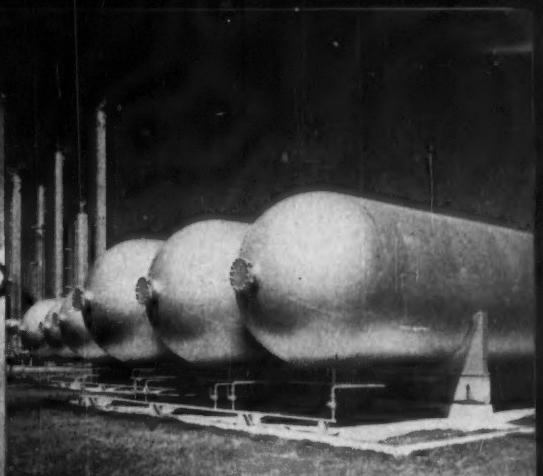
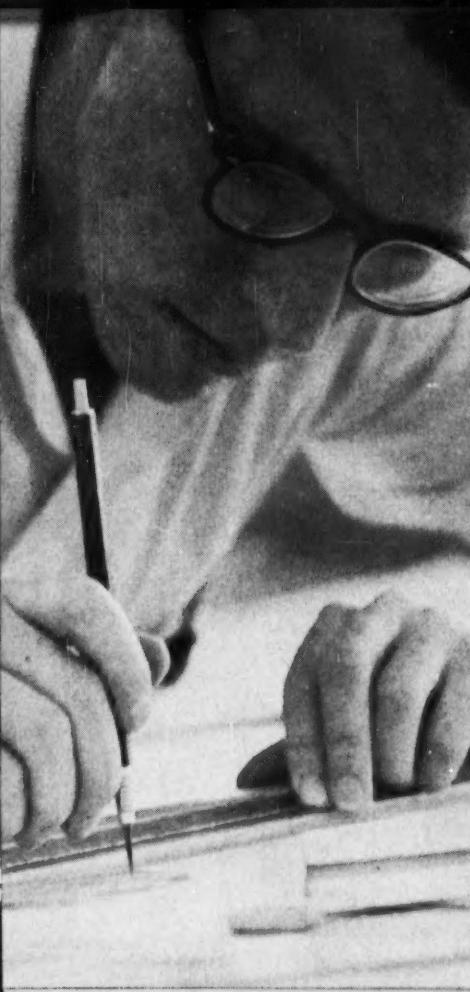
The extraction plant of Runnels Gas Products Corporation at Eunice, La., processes more than 300 mmcfd. of pipeline gas daily to yield 5,000 barrels of liquid hydrocarbons (all the natural gasoline and butanes, 96% of the propane and 35% of the ethane.) Fuel-gas consumption is less than 3%. Absorption takes place at -40°F.

What's new in gas processing?

Anyone contemplating construction of a natural-gas processing plant, whether its purpose is treating, extraction or a combination of both, must first solve a puzzle with three complex variables. The efficiency and profitability of the plant depend on how well the puzzle is solved.

The first variable is, of course, the volume and composition of the inlet gas stream. The second is the market, if any, for extracted products, and the third is the legal and technical requirements for residue gas.

Major shifts in these variables make it profitable today to design gas-processing plants that differ radically from those built only a few years ago, and to locate them much farther away from the gas fields.



*When you consider expansion...
the most important investment you can make
is in the creative ability of men.*

FLUOR

Engineers and Constructors

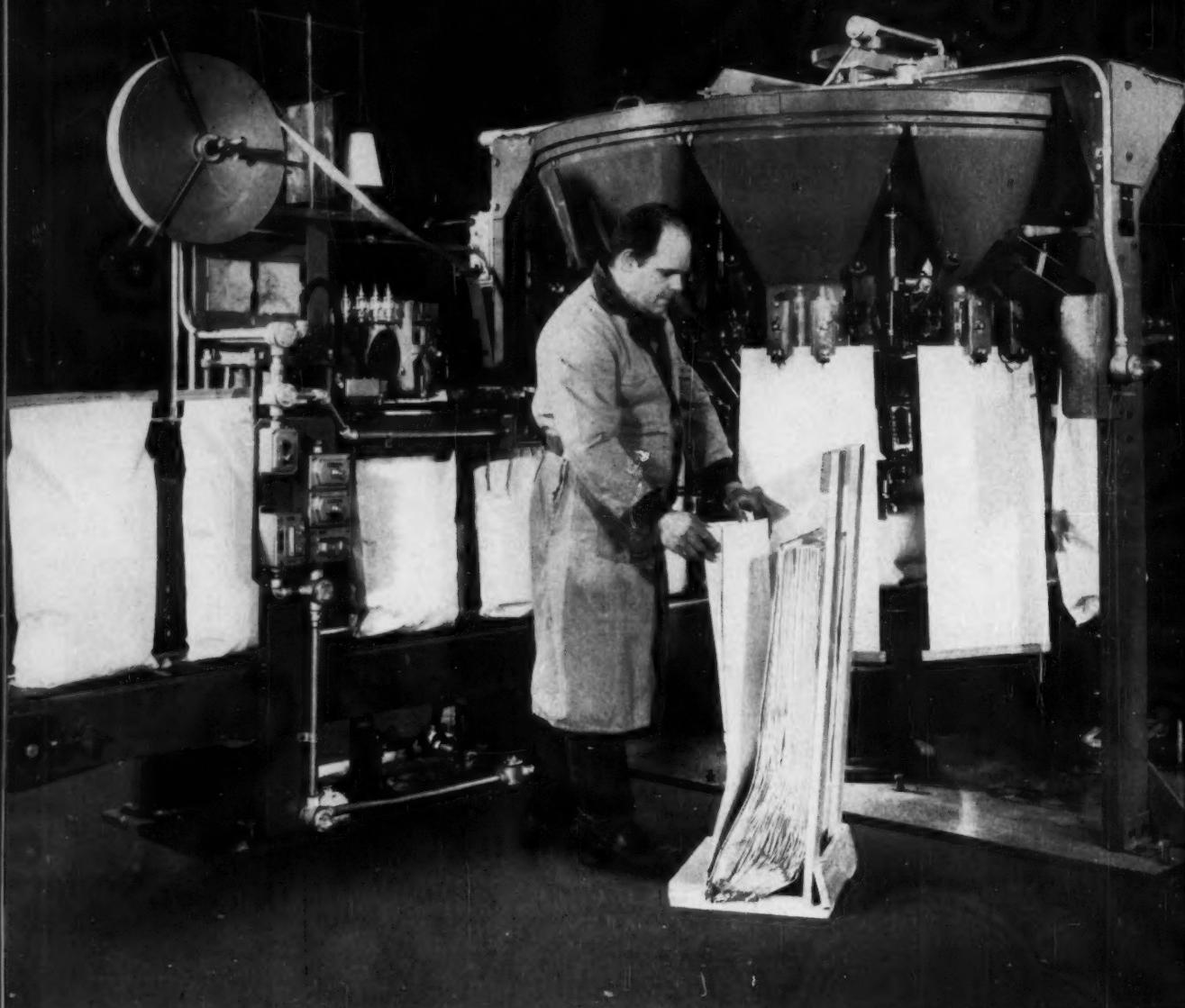
For example, it is now advantageous to build large, highly efficient extraction plants to handle great volumes of lean Louisiana gas. Such plants serve the tremendously expanded LPG market for butanes and propane, and the petrochemical market for both of these, plus ethane. Because of the volume of gas, and the degree of extraction desired, a combination of extreme cold and light-oil absorption is the most efficient way to get the marketable hydrocarbons out. Refrigeration costs are more than offset by the use of smaller quantities of lighter oil, with consequent savings in pumping and stripping capacity.

As the natural-gas industry mushrooms, the trend is toward large plants, not only for hydrocarbon extraction but for sour-gas treating as well. And as the plants

grow bigger, new levels of efficiency can be reached through methods that were impractical in smaller installations.

The development of new techniques for large-volume gas processing has been a Fluor contribution to the industry. The combined experience of the gas specialists in Fluor's Los Angeles and Midcontinent divisions represents a pool of advanced know-how that is unequaled anywhere.

The Fluor brochure, "Opportunities in Gas Processing," will be helpful to anyone planning construction of a processing facility. Write to Dept. 62, The Fluor Corporation, Ltd., 2500 South Atlantic Boulevard, Los Angeles 22, California.



Famous Model "AF" Bagpaker weighs, fills, settles and closes a 100-lb. bag every 2½ seconds!

WITH THIS engineering marvel at his command, the one man in our picture can package from 15 to 25 BPM. And he can instantly adjust the rate of speed through the machine's variable drive.

The operator simply hangs empty multiwalls on the hopper spouts as the 10-station turret rotates past him. The Model AF Bagpaker takes over from there.

It accurately *weights* any free-flowing or semi-free-flowing material, quickly *fills* the bag, *settles* it by vibration, automatically *preforms* the top, and *stitches* it tight. You can choose from nine different closures. Bagpak's exclusive "Cushion

Stitch," a reinforced two-thread double-lock chain stitch, is standard equipment.

The Model AF Bagpaker is ruggedly constructed of heavy welded steel throughout. Gears are fully enclosed and bathed in oil. Critical parts are of stainless steel.

There is a Bagpaker model for every need. They range from the completely automatic Model "A" Bagpaker, capable of packaging up to 60 tons per hour, to small, manually operated economy models.

Whatever your multiwall packaging needs, it will pay you to talk to your Bagpak sales and service representative.



S A L E S AND D I S T R I B U T I O N

Purchasing Agents Rate Chemical Advertising

ALL BUYERS	PURCHASES LESS THAN \$1 MILLION/- YEAR	PURCHASES MORE THAN \$10 MILLION/- YEAR	IN FIRMS WITH LESS THAN 500 EMPLOYEES	IN FIRMS WITH OVER 500 EMPLOYEES

1. What they name as principal motivating factor in reading advertising (percent):

Color	12	11	14	10	15
Illustration	31	30	31	33	32
Headline	30	39	36	35	29
Readability	22	20	19	22	24

2. What they want from industrial advertising (percent):

Technical data and descriptions	25	24	31	20	27
Information on product use	54	61	50	60	52
Facts on price advantage	20	15	19	20	20

3: What they prefer as advertising follow-up method for new chemicals (percent):

Direct mail or ad reprint	14	17	7	12	16
More-detailed technical data sheets	52	45	49	56	51
Calls by salesman	33	38	44	32	34

Are You Reaching the Purchasing Agent?

Is chemical advertising zeroing in on one of its prime targets — the chemical purchasing agent? Sales management and advertising executives have some new insights into that question this week as the result of a new survey of the Chemical Buyers' Group of the National Assn. of Purchasing Agents.

The survey was revealed for the

first time at this week's meeting of the group at its annual convention in New York. In essence, the results indicate that chemical buyers want advertising to feature product function, that new-product promotion should be followed up by more detailed technical data and that advertising plays an important — but limited — role in alerting purchasing

agents to new products. Moreover, chemical buyers, the survey showed, have some serious reservations about the physical appearance of advertising and follow-up practices.

The survey's main purpose was to make buyers more aware of advertising and to give suppliers and agencies useful data. About 230 firms were represented; 32% had annual chemical

How Chemical Buyers Rate Advertising Appearance

	ALL BUYERS	PURCHASES LESS THAN \$1 MILLION /- YEAR	PURCHASES MORE THAN \$10 MILLION /- YEAR	IN FIRMS WITH LESS THAN 500 EMPLOYEES	IN FIRMS WITH MORE THAN 500 EMPLOYEES
	Percent of respondents				
Message is too technical	9	10	7	10	9
Copy is too crowded	22	30	20	22	24
Message not specific with respect to function of product	41	41	41	45	42
Too many "gimmicks"	24	19	33	23	26

purchases exceeding \$10 million.

Motivation: Illustration and headlines ranked high, were reported by about 30% of the respondents as the top attention-getting features (see chart). The "readability" of the ad finished a strong second (22%). Use of color was named by 12% as the motivating factor in perusing ad copy.

Data Needs: A total of 345 answers were received to the question, "What kind of information do you want chemical manufacturers to supply to you in their ads?" Results revealed that 54% of the buyers want information on function and use of products. Buyers rated technical data and product descriptions ahead of data on price advantages (25% vs. 20%).

New Product Role: Ads help acquaint buyers with new products.

In the survey, buyers told how they became acquainted with 517 new products. The research and technical staff of the buyer's own company got the plaudits in 34% of the cases for first alerting buyers to new chemicals. For 28% of the cases reported, buyers cited salesmen's calls as the original source of information.

The survey didn't show, however, to what extent the technical personnel had first learned of new products from advertisements.

But after that, it's a toss-up between becoming acquainted with a new chemical through use of a product made by a competitor (11%) or through advertising (10%).

As a source of first exposure to new chemicals, advertisements clearly outranked the production department (7%), the sales department (4%),

direct mail (3%), management (2%).

Ad Improvement: If purchasing agent criticism of ad appearance is any indication, advertising men have their work cut out in improving copy practices. Of the 318 "pet gripes" tabulated, some 41% referred to advertisements "not specific as to function of product."

Approximately equal numbers of complaints were recorded for ads "too gimmicked" (24%) and ads "too crowded with copy" (22%). Only 9% of the "gripes" cited copy for overemphasis of technical aspects.

Related to criticism was the ease (or difficulty) buyers noted in obtaining supplemental information. The survey indicates that a total of 24% of the buyers reporting find their efforts to get extra information "frustrating" or "slow." About two-thirds report supplier cooperation in the matter as "satisfactory."

Smaller companies evidently have more difficulty than do their larger counterparts in obtaining additional data. While 70% of the buyers in companies with over 500 employees term "obtaining supplementary information" as "satisfactory," only 59% of the P. A.'s in companies with less than 500 employees answered the same way.

What is the best way to obtain additional data? Here's how buyers rank the methods:

Method	Replies
Ask salesman	35%
Make phone call	27%
Write letter	18%
Return postcard	15%
Clip coupon	5%

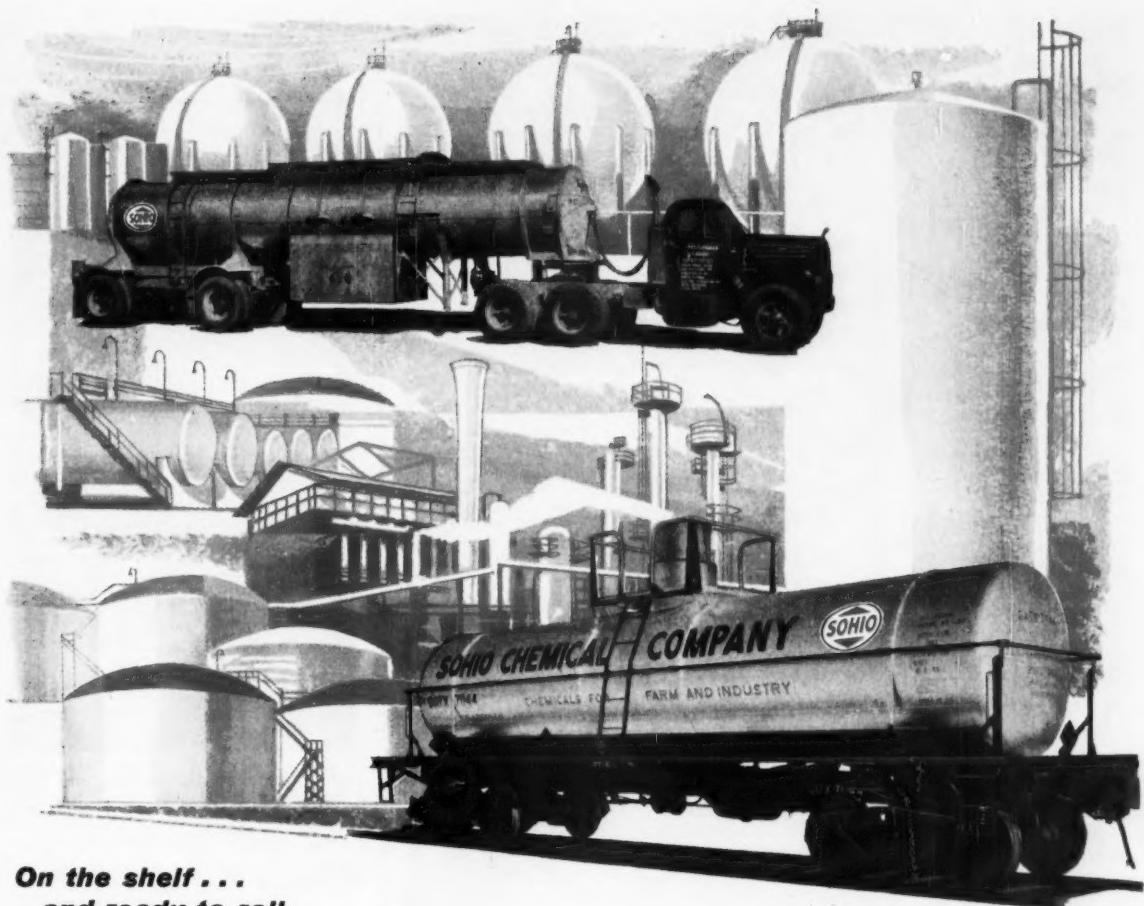
The survey contained a separate question to determine P. A. preference in type of follow-up desired after the first advertising exposure to new chemicals. About 52% of the buyers named "more detailed technical data sheets" as the most preferred follow-up. In second and third place: salesmen calls (33%) and directed mail or ad reprints (14%).

Extra Mileage? Sales executives and advertising managers have long urged sales staffers to make more use of advertising reprints on sales calls. Yet, only small numbers of salesmen make use of their company ads when talking to chemical buyers.

Nearly half (46%) of the respondents report that only 25% of the salesmen that they see "are acquainted with or make use of their own company's advertising during a sales interview." Advertising managers may be able to profit from "merchandising" their work to sales staffers.

Summing Up: Much chemical advertising is necessarily aimed at a variety of audiences. That's because purchasing influences are spread over many corporate functions. In fact, of the 409 influences on purchase decision-making named by the buyers, about 47% stemmed from the technical or research departments, 28% from production departments, 13% from top management and 11% from the sales department.

For that reason, advertising managers will have to apply the results cautiously. For buyer-oriented promotion, they'll be on the right track if ads are well illustrated, if copy stresses product function.



**On the shelf...
and ready to roll**

Nitric Acid from Sohio

**Special rail and truck fleet service
spells fast delivery direct to your plant**

Combine a supply of high-quality HNO₃ "on the shelf" with Sohio's on-time, special handling direct to your plant. It adds up to the acid you need . . . when you want it.

Take delivery by Sohio's truck fleet, for example. There's no delay in lining up shipments . . . no time and cost consuming rehandling . . . no divided responsibility during unloading. A crew of Sohio-trained "Fleet Men," operating trucks equipped with self-contained pumping

units and latest safety equipment, make delivery direct to your plant.

And, of course, by truck or rail, you get exactly what you ask for from Sohio — HNO₃ in 42° and 40° Be' grades. Each meets your strength and oxides specifications . . . the most exacting sulfates, chlorides and color properties.

Next time you need high-quality nitric acid, "on the shelf and ready to roll," call the Man from Sohio.

High-quality Sohio industrial chemicals: 83% Ammonium Nitrate Solution . . . Nitric Acid . . . Urea . . . Aqua Ammonia . . . Anhydrous Ammonia (commercial and refrigeration grades).



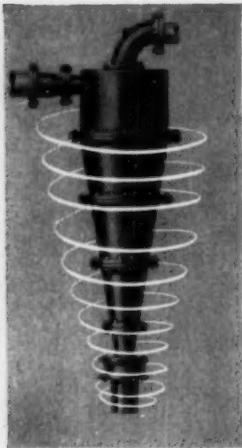
...we're serious about SERVICE at Sohio
SOHIO CHEMICAL COMPANY

FORT AMANDA RD., P.O. BOX 628, LIMA, OHIO
Phone CAPitol 5-8015 or wire (TWX call letters LM-497-U)

15-59

DORR-OLIVER POINTERS

A SERVICE TO THE PROCESSING INDUSTRIES



WET CYCLONE SEPARATION OFFERS WIDE POTENTIALITIES

*Micron classification
now possible in a
wide range of materials
of construction . . .*

The idea of using centrifugal force to separate particles in a liquid medium has developed into a highly efficient classification technique. Applications now range all the way from handling the comparatively coarse, $\frac{1}{4}$ inch material found in coal and mineral preparation to the micron-size separations required in food, pharmaceutical and chemical processing.

These expanded potentialities are the result of a continuous development program carried out by Dorr-Oliver. One of the important discoveries of this research was that as the diameter of the cyclone is decreased, the fineness of classification is increased. With midget type DorrClyones such as the one illustrated, classification in the 2 to 10 micron range is now standard practice. Even finer separations may now be obtained depending on the specific gravity of the materials handled.

Nesting a number of these units in common housings provides almost unlimited capacity. One extraction system employs 4,320 cyclones in nine compact housings.



Many of these multiple DorrClyone Systems are now in operation for concentrating dilute starch slurries and sizing of materials such as pharmaceuticals, clays, talc and pigments.

Among the advantages of the wet cyclone are its extreme simplicity and its tremendous capacity for size. Often it can eliminate a more costly machine . . . or contribute real savings in space requirements. Mate-

rials of construction range from cast iron (with rubber or other linings, if required) to porcelain. Nylon or molded rubber blocks are commonly used in the miniature sizes, Kel-F, stainless steel and Stellite being available for special applications. Practically any abrasion or corrosion problem can thus be handled. Units have been manufactured to operate at pressures as high as 2500 psi. With units from 10 mm. to 24 inches in diameter, applications are as wide as industry itself.

If you have any kind of classification, clarification, or thickening problem, the wet cyclone technique certainly merits investigation. Maybe we have the answer you need. Dorr-Oliver Incorporated, Stamford, Conn.

DorrClyone T.M. Reg. U.S. Pat. Off.

*Dorr-Oliver offers a wide range of equipment, methods
and complete systems for the processing industries.
Operations include:*

ROASTING • DRYING • CALCINATION • CLASSIFICATION • THICKENING •
SCREENING • FILTRATION • CLARIFICATION • WASHING • AGITATION •
CENTRIFUGATION • ION EXCHANGE • PUMPING

SALES



Farm chemical distributors and specialists study MH-30 use techniques.

Saving MH-30's Market

U.S. Rubber's Naugatuck Chemical Division is moving swiftly this week—by means of greatly stepped-up educational programs for tobacco growers—to end a threat to important maleic hydrazide (MH-30) markets. Specifically, the threat is the outgrowth of the proposed North Carolina ban on use of MH-30; although the proposal has been killed, it has brought questions about the chemical's value to tobacco growers.

Naugatuck and other MH-30 formulators, such as California Spray Chemical, Olin Mathieson and Pennsalt, are planning to hold about 100 meetings with dealers, growers and Dept. of Agriculture extension service county agents in the next few months. And in a unique twist, Naugatuck is discontinuing educational-type MH-30 advertising.

The threat to MH-30 markets was posed by some tobacco buyers and cigarette manufacturers (*CW*, May 30, p. 24). They recently sought, without success, to get North Carolina's legislature to ban MH-30 use on tobacco. The chemical is used to control growth of tobacco suckers—

sprouts on growing plants that consume nutrients that would otherwise go into salable leaves. Tobacco buyers contended that MH-30 produced low-quality tobacco leaf that was "slick, soggy and leathery."

Naugatuck Chemical, however, reports that the difficulties cited by tobacco buyers result only when the chemical is misused. Too much or too little MH-30 or too-early harvesting of the leaf, it says, produces the undesirable type of tobacco.

Although vigorous opposition from tobacco growers (who favored MH-30 because it eliminated costly, manual sucker picking) led to defeat of the bill, Naugatuck is keenly conscious of the long-term problem. Unless growers acquire adequate know-how, the threat to MH-30 markets will remain. And the markets at stake are sizable.

About 2.2 lbs./acre of technical-grade maleic hydrazide are used. Last season, some 450,000 lbs. were spread on about 200,000 acres in the South—roughly one-fifth of the total tobacco acreage and the total tobacco market for MH-30.

To match last year's sales record, Naugatuck must move fast, because the application season is already beginning.

Program: Major emphasis will fall on lectures and field demonstrations. Naugatuck is dropping its MH-30 advertising to avoid the possible stigma of "commercialism." Lectures and demonstrations, it tells *CW*, will carry a high degree of authority.

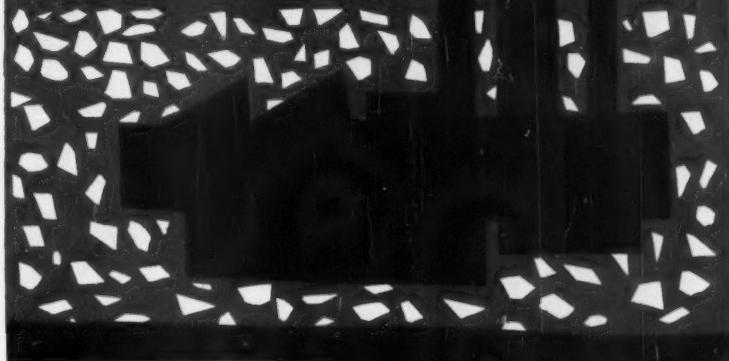
The firm will detail six men to handle the education program, will set up 30-40 sessions. And its formulators will hold about 60 sessions this year. Indicative of the size of the step-up: Naugatuck held only 15-20 such meetings last season; its formulators held few if any.

How They Work: Already, demonstrations for many farm chemical dealers and county agents have been held (*see picture*). Working with dealers and agents, Naugatuck representatives line up meeting space, then invite tobacco growers to attend an evening class. The company may turn to radio to spur attendance.

Evening lectures last two-three hours, include, says the company, a special slide-film presentation and literature. And the company follows up lectures with a special field demon-



NOW FROM KAISER CHEMICALS... A FULL LINE OF CALCINED ALUMINAS FOR CERAMICS, ABRASIVES, REFRACTORIES



Now—for manufacture of high grade abrasive and ceramic products, Kaiser Chemicals offers you two grades of calcined alumina: KC-1 and KC-2. These are high-purity, uniform quality aluminas, both available in coarse and fine particle sizes.

And for manufacture of electrical and electronic grade ceramics—where superior dielectric properties over a wide temperature range are required—Kaiser Chemicals now offers grades KC-10 and KC-14. These are high-purity aluminas produced with very low soda content.

Typical Chemical Analyses:

	KC-1	KC-2	KC-10	KC-14
SiO ₂	0.02%	0.02%	0.10%	0.10%
Fe ₂ O ₃	0.02	0.02	0.02	0.02
TiO ₂	0.002	0.002	0.002	0.002
Na ₂ O	0.60	0.50	0.10	0.04
Loss on ignition	0.70	0.10	0.15	0.15
Al ₂ O ₃ (by difference)	98.658	99.36	99.5	99.6

This wide range of top grade aluminas is designed to meet your specific performance requirements. For prompt service, or for complete specifications on any special alumina product, call or write Kaiser Chemicals Division, Dept. A9831, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed at right:

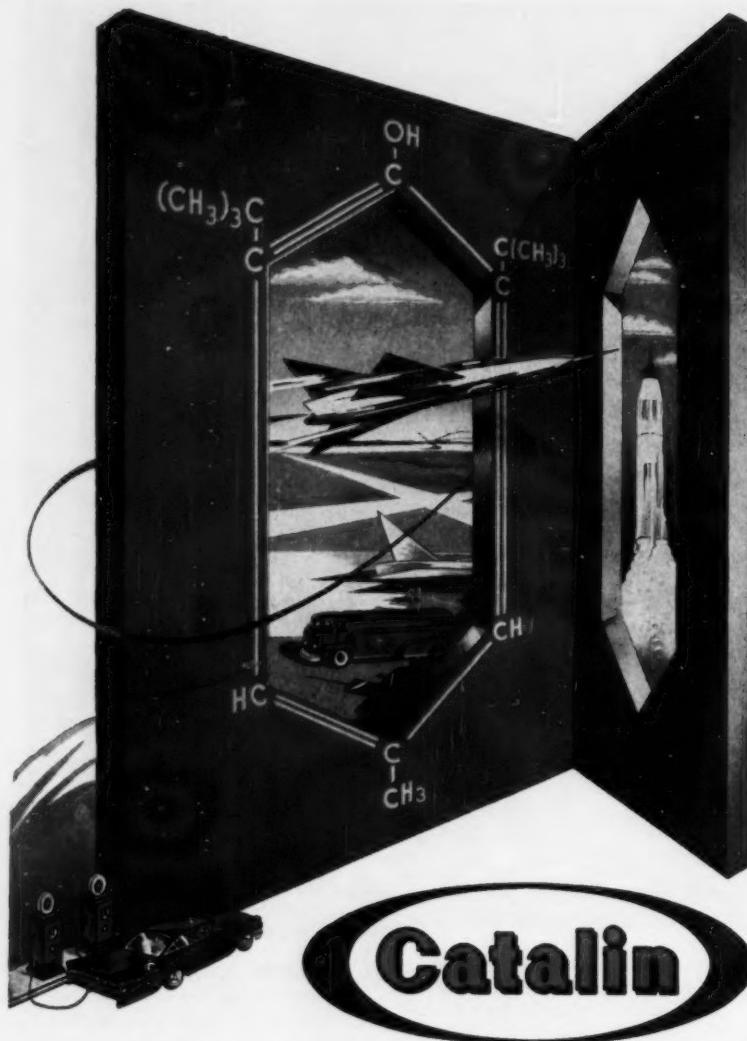
PITTSBURGH 22, PA., 3 Gateway Center
HAMMOND, IND., 518 Calumet Building
OAKLAND 12, CALIF., 1924 Broadway



Send Coupon For New Technical
Brochure, "Kaiser Aluminas"

Kaiser Chemicals Division, Dept. A9831
1924 Broadway, Oakland 12, California
Please send your new technical brochure with complete information on the NEW Kaiser special alumina products to:

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____



antioxidant CAO-1

98.9% PURE / sets the highest standards
for purity and effectiveness

Catalin ANTIOXIDANT CAO-1...the field's finest grade of 2,6-di-tertiary-butyl-para-cresol...meets U. S. Government military specifications for use in aviation gasolines, turbine and jet fuels. A major advantage achieved with this heat-resistant, water-insoluble antioxidant is that high-octane fuels are effectively protected, with no loss of octane rating. Gum and peroxide formations are inhibited, and deposits in the aircraft intake manifold and engine are markedly reduced.

Catalin ANTIOXIDANT CAO-1 stabilizes high-octane automotive gasolines, as well as turbine, insulating, hydraulic and transformer oils...in fact, nearly any petroleum hydrocarbon exposed to oxidizing conditions.

Samples, literature and technical assistance wait upon your request. Inquiries invited.

Catalin Corporation of America
One Park Avenue, New York 16, N.Y.
*Typical Analysis

chemicals
plastics
resins

SALES

stration of application techniques. The need for correct use and the dangers of misuse will be stressed. Special efforts will be made to avoid the appearance of hucksterism.

Naugatuck is planning the lecture and demonstration schedule to tie in with the tobacco season. The program is already under way in Florida and Louisiana; the company will move north as the season progresses—through North and South Carolina, Virginia, Georgia, Kentucky, Tennessee and other states.

Payoff: For its efforts, Naugatuck hopes to do more than merely prevent future legislative moves against MH-30 and hold onto present markets. It hopes the drive will convince both growers and buyers that when the product is correctly used, top-quality tobacco can be grown. And it hopes to pave the way for wider use of maleic hydrazide. That's why its field men, says a company spokesman, will be putting in "20-hour days" in the next few months.

DATA DIGEST

- **Polymers:** Eight-page directory tabulates physical properties and major uses for Borden's line of polyvinyl acetate emulsions and solutions, styrene-butadiene emulsions, acrylic emulsions and solutions, polystyrene emulsions, sodium polyacrylate thickeners, polyvinyl alcohols and polyvinyl acetate bead resins. Borden Chemical Co., Polyco-Monomer Dept. (New York).

- **Catalog:** Folder lists Callery's line of high-energy boron fuels and borane chemicals such as diborane, methyl borate, trimethoxyboroxime and sodium borohydride. Development chemicals such as alkyl boric acids, amine-boranes, trialkyl boranes and decaborane are also listed. Callery Chemical Co. (Pittsburgh).

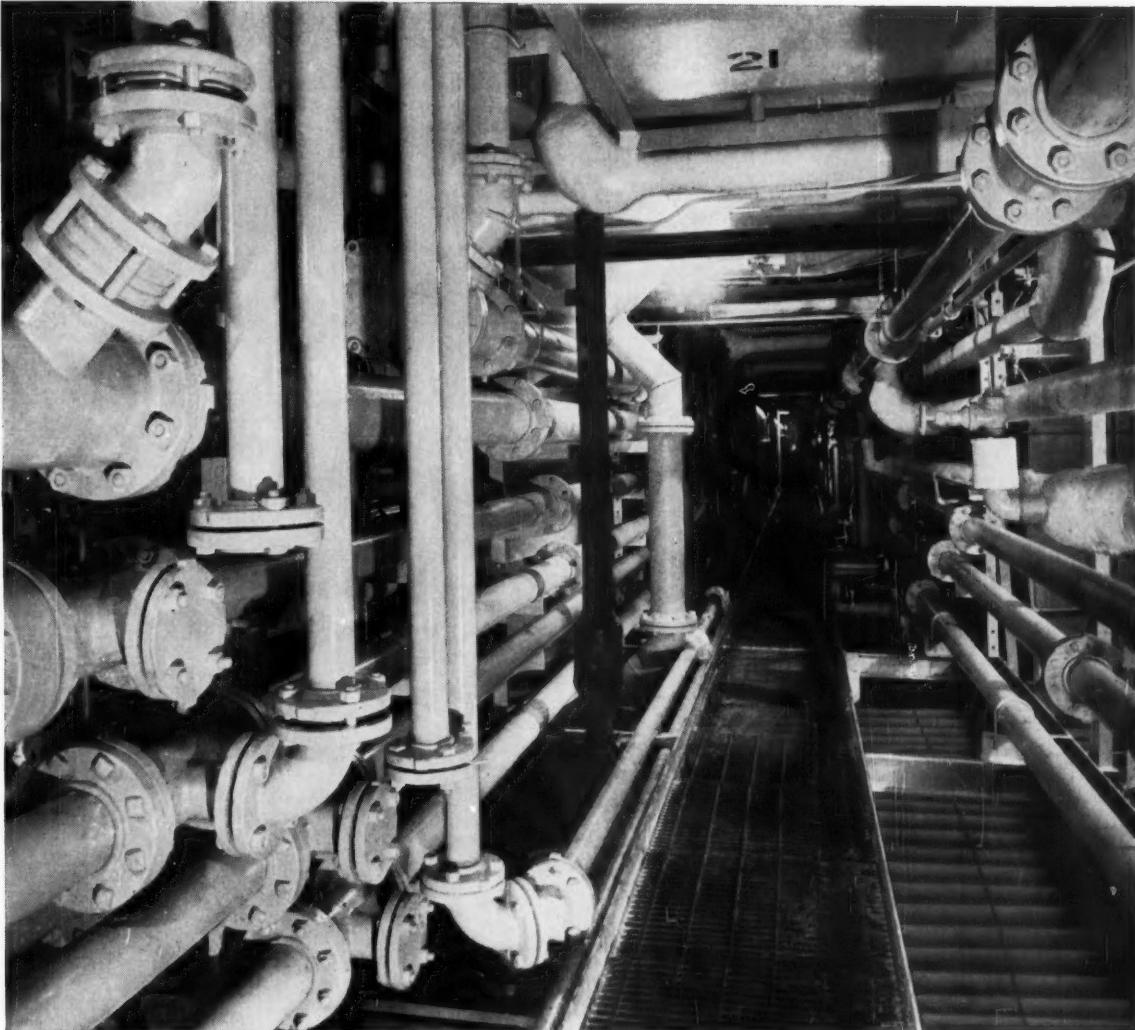
- **Metal powders:** New brochure describes uses of prealloyed metal powders in metal fabrication. Vanadium-Alloys Steel Co. (Latrobe, Pa.).

- **Water testing:** Bulletin describes equipment and reagents used in rapid determination of water minerals and impurities. Hagan Chemicals & Controls, Inc. (P.O. Box 1346, Pittsburgh).

- **Sludge solvent:** Folder tells how fuel oil sludge solvent can be used. Betz Laboratories, Inc. (Gillingham & Worth Sts., Philadelphia 24).



SARAN LINED PIPE



After six years of hot sulphuric acid . . .

Saran Lined Pipe still performs dependably

When 20,000 linear feet of pipe must carry a constant stream of hot sulphuric acid . . . when production requirements make pipeline failure intolerable . . . pipeline dependability is the lifeline of the plant. For the past six years, Saran Lined Pipe has carried dependably an unending flow of corrosive chemicals at Industrial Rayon Corporation's Painesville, Ohio, plant. The installation shown above carries hot sulphuric acid and other chemicals used in Industrial Rayon's Continuous Process method of making tire cord. This Saran lined supply and return piping, serving all of the plant's spinning machines, carries the solutions from lower levels to spinning machines on the main floor. Pumping pressures range from 45 psi upward, and solution temperatures are above 125° F.

The Saran Lined Pipe was installed in 1953 and has been in continuous use since. Maintenance costs have been extremely low and I.R.C. engineers report that, during these six years, Saran Lined Pipe has performed dependably under their corrosive operating conditions.

Whenever dependable piping systems are required, whatever the degree of corrosion or chemical activity, consider Saran Lined Pipe. Saran Lined Pipe, fittings, valves and pumps are available for systems operating from vacuum to 300 psi, from below zero to 200° F. They can easily be cut, fitted and modified in the field without special equipment. For more information, write Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale, Michigan, Dept. 2282AM6-20.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN



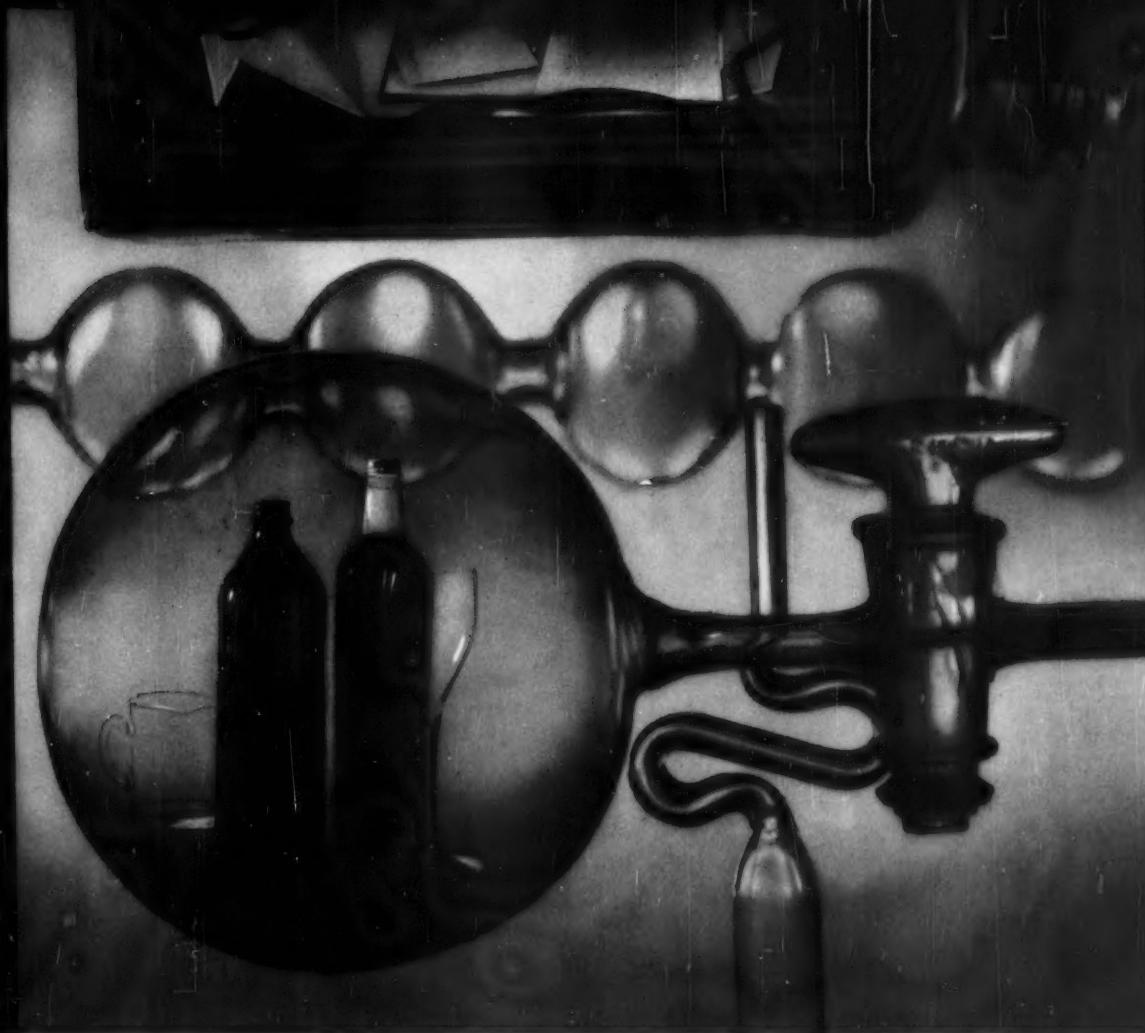
COLUMBIA-SOUTHERN CHEMICALS ANSWER

LOWER COSTS, BETTER PROFITS . . . however you analyze it, dollars saved in processing show up clearly on the balance sheet. That's the big reason you look so closely at the total "package" you get when you buy such essential materials as chemicals.

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CHLORINATED SOLVENTS are used in such divergent operations as degreasing metal products and dry cleaning delicate gowns.



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Dr. Erle Ayres, Ph.D., Duke University
Industrial Products Department,
Callery Chemical Company

amine- boranes



"their catalytic, color-stabilizing and antioxidant properties and their selective reducing action in non-aqueous solvents are principal points of interest"

Q. Dr. Ayres, what are Amine-Boranes?

A. They are complexes of borane (BH_3) with amines. Most of the secondary and tertiary amines form stable complexes.

Q. What functional groups do the Amine-Boranes reduce?

A. They reduce aldehydes, ketones, and acid chlorides. They are especially useful in non-aqueous systems.

Q. You mentioned stabilization. What do you mean?

A. The slow reduction of carbonyl groups can prevent their accumulation, and later formation of acids and color, in systems susceptible to autoxidation. For example, a low concentration of Pyridine-Borane can prevent discoloration of pyrroles.

Q. Have any new uses for Amine-Boranes been developed?

A. Amine-Boranes rapidly, efficiently, and conveniently shift internal olefinic unsaturation to the terminal position. This hydroboration reaction can also be used as a unique method to convert olefins to Trialkyl Boranes and, by subsequent oxidation, to primary or secondary alcohols.

Q. Are Amine-Boranes stable in water? How do they compare with borohydrides in hydrolytic stability?

A. Trimethylamine-Borane in water loses about 2-3% of its hydrolyzable hydrogen per day. Higher tertiary Amine-Boranes should be even more resistant to hydrolysis. In general, Amine-Boranes hydrolyze more slowly than borohydrides, especially at intermediate (neutral) pH ranges.

Q. How do acids affect the Amine-Boranes?

A. The Amine-Boranes are stable in glacial acetic acid. Dilute mineral acids hydrolyze them; with Lewis acids diborane is generated.

Q. What are some other solvents for Amine-Boranes?

A. Benzene, ethers and hexane. Pyridine-Borane is also very soluble in alcohol and pyridine.

Q. How toxic are Amine-Boranes?

A. These materials are not Class A or B poisons; toxic effects are easily avoided by standard safety procedures that minimize skin contact, ingestion, and breathing of vapors.

Q. What Amine-Boranes are offered?

A. Dimethylamine-Borane, $(CH_3)_2NH: BH_3$; Trimethylamine-Borane, $(CH_3)_3N: BH_3$ (white solids); and Pyridine-Borane, $C_5H_5N: BH_3$ (a liquid) are available now in large quantities. Other Amine-Boranes will be prepared as compounds with different properties are needed. We'd be glad to hear of your requirements for other Amine-Boranes.

Write or phone for specific information on the Amine-Boranes.

Phone: FOrest 4-1130 TWX: Perrysville, Pa. 117

9600 Perry Highway, Pittsburgh 37, Pennsylvania

SPECIALTIES



Chemical specialties used in keeping marine fleets shipshape now have a \$10-million/year market.

Fair Forecast for Seagoing Specialties

Makers of marine chemical specialties are keenly contemplating next week's dedication of the St. Lawrence Seaway. The enlarged Seaway will open up areas barely touched by marine needs before. New ports, more ships, more maintenance yards will be needed, and the business of selling marine chemical specialties should get a hearty lift.

In spite of the current low-volume ocean shipping, the marine chemical specialty business has moved along at a healthy clip. Companies offering marine chemical products say the field turns in about \$10 million/year now,* and shows signs of becoming even bigger. American flag ships require

about \$2.5 million/year worth of specialties; foreign flag ships, the remainder. Foreign flag ships total up to be bigger users of specialties simply because there are more of them. According to the American Merchant Marine Institute, there are now 1,000 American flag ships (615 freighters, 350 tankers, 35 passenger ships) and over 7,000 foreign flag ships.

How much chemical specialties one ship requires each year depends pretty much on the size and type of vessel. A large tanker may use as much as \$25,000/year worth of special tank cleaners. On the other hand, a small passenger ship may use only \$500/year worth of specialties. Average chemical specialty expenditure per year for one ship, however, is \$2,500.

*Figure doesn't include marine paint, coatings for tankers or wax. See CW, May 25, '57, p. 32 for data on the marine paint market.

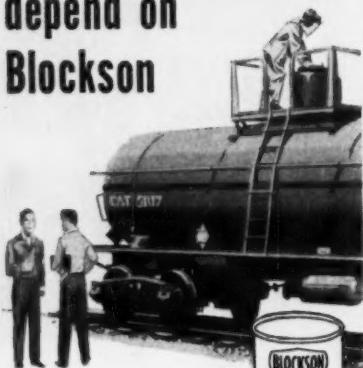
What They Are: Products offered by companies in the marine specialty field include tank cleaners, degreasers, all-purpose cleaners, carbon strippers, electrical cleaners, rust preventives, fuel oil additives, descalers, oil spill eradicators, bilge cleaners, soot removers, floor finish strippers, dishwashing compounds, various other solvents and cleaning compounds. Most companies strictly in the marine cleaning end of the business don't consider marine paint, wax or tank coatings as part of their market. These materials are usually offered by companies that specialize in just one line of products, such as marine paint, or by companies that aren't solely in the marine business.

Who's Sailing: Probably 100 U.S.

Hydrofluoric Acid

Anhydrous, Min.
99.0% + HF
Aqueous, Min.
70.0% HF

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dependable
HF service
depend on
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To HYDROFLUORIC ACID buyers, Blockson provides the capacity for steady, dependable QUANTITY shipment. Blockson quality control results in product purity that exceeds AEC and top commercial requirements. Technical assistance by men who supervise our own HF operation is available for all phases of your HF service. Write for technical bulletin and prices.



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SPECIALTIES

companies are selling specialties for ship maintenance but only a handful of them are nationally known. Some of the leaders: Gamlen Chemical Co. (San Francisco); The Penetone Co. (Tenafly, N.J.); The Perolin Co., Inc. (New York); New Process Chemical Co., Inc. (San Francisco); Rust-Oleum Corp. (Evanston, Ill.); E. F. Drew, Inc. (New York); Magnus Chemical Co. (Garwood, N.J.); Oakite Products, Inc. (New York); Exit Chemical Co. (Hoboken, N.J.); Maritime Chemical and Repair Co. (New York); Wyandotte Chemicals Corp. (Wyandotte, Mich.) and Dunham Chemical Co. (Chicago). Some of the companies specializing in marine paint: International Paint Co., Federal Paint Co., Red Hand Compositions Co. and Inter-Coastal Paint Corp. (all in New York).

How They Sell: Selling products for ships is a craft in itself, and sales procedures vary widely. It's especially important in the marine field, more so than in many other fields, to establish strong personal contacts. Chemical salesmen must know who controls the buying in each shipping company and the exact purchasing policy of each potential customer. Here are a few marine product selling and buying procedures:

In this field, it's important to sell know-how and service. It's not at all unusual for chemical company salesmen to go aboard ship, show the ship's staff and crew exactly how to use the products correctly. Penetone Co. told *CW* its salesmen often sail the high seas, make sure a self-rinse "at sea" tank cleaner, for example, is doing the job it's designed to do aboard ship.

Salesmen must know the marine business and jargon as well as the chemical business. If a salesman calls a bulkhead a "wall" or doesn't know what "deck," "reefer box" or "soo-gie" means, he's not likely to find a listening ear. He must also be familiar with each ship's facilities, must frequently work out a cleaning procedure for a particular type of equipment aboard ship.

How They Buy: Buying policies of shipping companies differ also. Frequently, each ship has its own buying routine. Shipping companies seldom buy fleet requirements, instead let each ship determine its own needs. Products are usually delivered to the

pier, are seldom warehoused by the shipping company. Knowing whom to sell to is one of the marine specialty makers' toughest jobs. To sell marine specialties, chemical makers must know the marine superintendent, the captain of the ship, the chief steward, chief engineer, chief mate, port captain, port steward and the shipping company's purchasing director—anyone of whom could urge dealing with any one supplier—or veto a purchase from it. Here's how the system works:

The captain of each ship submits a requisition for supplies to his agent—usually the shipping company's marine superintendent. The requisition is usually made up by the chief engineer, chief steward and chief mate, signed by the master. Then, the marine superintendent and/or port captain and/or port steward approves the requisition. These shipping officials may add other supplies, delete brandnames or add brandnames. The supply list then goes to the shipping company's purchasing agent, who in turn hands it over to the chemical company. The chemical company—if it's a direct seller—may supply the ship itself or, if not, direct a ship chandler (distributor) to stock the ship. Some shipping companies bypass the chemical company, deal only with a ship chandler.

On American flag ships, the marine superintendent usually has the strongest buying voice. The captain of the ship is the second most powerful buying influence.

Generally, most U.S. ship captains must have their own company's approval before they purchase supplies. This is particularly true if the captain is employed by a large shipping company. On foreign flag ships or in smaller U.S. shipping companies, the captain of the ship is usually the primary buying force.

But there are many exceptions to this sales pattern. On some ships, the chief mate or engineer may order all his own supplies without the captain's or the shipping company's approval.

Most ships carry enough stores to last one complete voyage. But when a ship is away from home port for two to three years at a time, stores frequently run out. This is particularly true on foreign vessels, which generally stay away from home port longer than U.S. ships do. When a



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One of our exacting carload customers of Emersol 132 recently advised us that they were discontinuing their meticulous lab-checking of all shipments of Emersol 132 Lily Stearic Acid.

This resulted from an examination of hundreds of past lab reports in which they found that the quality of Emery Stearic Acid simply doesn't vary—and that the considerable expense involved in over one hundred analyses every year could be safely eliminated. And when you consider that the reputation of a nationally known toiletry was at stake, we think this unqualified acceptance of Emersol Stearic Acid becomes the ultimate compliment to Emery quality.

Emersol 132 is the finest of the triple-pressed stearic acids. Its extremely low iodine value and unusually low content of impurities make it the purest commercial crystalline stearic acid available. For your sake—and ours—we intend to keep it that way. Check Emersol Stearic Acids in your product . . . write Dept. I-6 for sample or descriptive literature.

P.S. You will be glad to learn that the consistent quality of Emersol 132 costs no more than any other triple-pressed stearic acid.



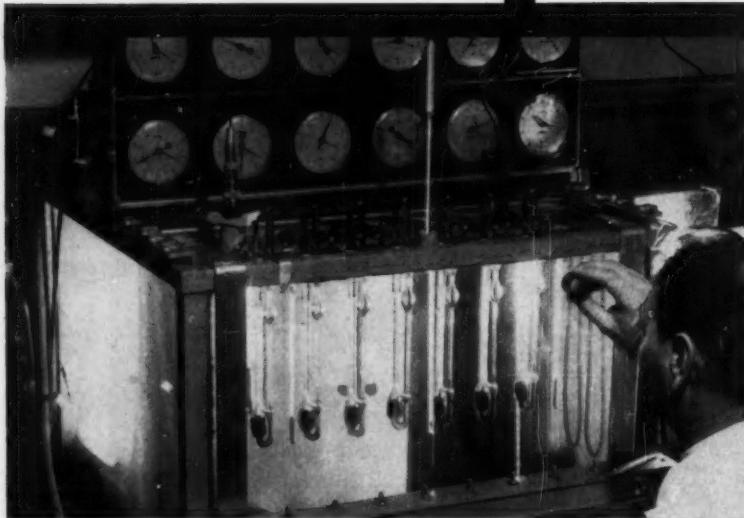
Fatty Acid Sales Dept., Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

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SPECIALTIES

ship needs supplies away from its home port, the captain sends a radiogram to his agent—either a chemical company, a ship chandler, or his home office, depending upon the policy of his company. If his ship plans to dock in Trieste, say, and needs three 55-gal. drums of a degreasing compound, he so radiograms his agent. Because he's frequently in port for only a few hours, the material must be on the pier, ready to be loaded. If the ship chandler or chemical company fails to meet delivery, the material stays on the dock. No captain will hold up a ship for \$400 worth of cleaning chemicals.

The bulk of chemical specialties used aboard ship probably moves through ship chandlers. This is largely because it's too costly for chemical companies to maintain warehouses at every port. Chandlers permit manufacturers to provide both warehousing and quick delivery. However, in most major ports (e.g., New York, London, San Francisco, Mobile), chemical makers do set up their own warehouses and make their own deliveries, pocketing the usual 10% chandler markup.

On foreign flag ships, the captain of the ship generally specifies which ship chandler he will buy from. For American flag ships, the chemical company or the shipping company selects the chandler. The practice of captains receiving a kickback (frequently 5%) from the chandlers has abated somewhat on U.S. ships, but it's still fairly common on foreign flag ships. A few shipping companies (the Onassis interests) maintain their own ship chandlers.

Cleaning standards are usually up to the captain of the ship. Only government standard is the Coast Guard's ruling on what products can be used below deck. To sell a specialty item that can be used below deck, chemical makers must obtain a Coast Guard permit. This permit does not pertain to the merit of the product, instead sets maximum flammability and toxicity limits for the product.

Reason to Grow: The slump in shipping business has spurred marine specialty business because specialty makers are frequently able to point out the labor- and cost-saving virtues of their products. According to one marine specialty maker, "When the shipping companies are hard



U.S.I. CHEMICAL NEWS

June 20



A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries



1959

Growing Market Is Seen For Phosphoric Acid as Fertilizer Raw Material

In a recent article in Farm Chemicals Magazine, Lawrence Byck—U.S.I. Manager of Heavy Chemical Sales—discusses the value of wet-process phosphoric acid as an agricultural chemical raw material. Phosphatic Fertilizer Solution (PFS) has been an intermediate in triple superphosphate production for many years, but its use as a raw material for fertilizer generally dates back only to 1957.

According to Mr. Byck, the usefulness of PFS depends on these factors:

- (1) It is the only commercial source of P_2O_5 in liquid form. Dusting and massive solids handling problems are eliminated.
- (2) It is by far the most highly acid source of P_2O_5 commercially available.
- (3) It is the most concentrated commercial source of P_2O_5 —52-54%.
- (4) It may or may not be a markedly economical source of P_2O_5 , depending on consumer location.

Given these factors, says Mr. Byck, here are some of the things PFS can do for the mixed fertilizer industry:

- Neutralize large quantities of ammonia, because of high

MORE ➤

New Commercial Route to Copper Strip Starts with Ammonia Leaching of Scrap

Copper strip can now be made commercially from a powder which is derived from copper scrap by chemical means. Scrap is leached with ammonia, and reduced to copper powder with hydrogen gas at 375° F and 1,200 psi.

Via a specially developed process and related equipment, the powder is roll-compacted into strip that is sintered at 50-100° F below its m.p. under a hydrogen atmosphere. The strip is then rolled and annealed to specification.

Sodium Addition Improves Properties of Alloy

Recent tests have indicated that metallic sodium, added in small quantities to aluminum 356, improves ductility and the already fine mechanical properties of this casting alloy. As little as 0.02 to 0.04% seems to do the job. Above about 0.04%, additional sodium causes fluidity loss and increased porosity, with an accompanying loss of mechanical properties.

Aluminum 356, used extensively in industrial, aircraft and missile service, contains about 7% silicon and 0.3% magnesium. The silicon crystals are large and needle-shaped, which tends to make the structure relatively brittle. Sodium refines the crystals to a small, finely dispersed form to improve alloy properties.

In the tests, sodium bricks were added by immersing them in the molten alloy wrapped in aluminum foil. The foil gradually melts and allows the sodium below the surface of the molten alloy, to do its work.

Missiles and Rockets, Fast Growing Market for Chemical Materials and Research

Propellents, Lubricants, Plastics, Nonferrous Metals Among Materials Researched, Developed and Supplied by the CPI.

It is estimated that more than 25% of the \$4-billion-plus government expenditure for missiles and rockets, in the fiscal year just ending, went to the chemical industry for materials, research and development. For the fiscal year starting July 1, total government expenditures for this program are expected to be about 30% greater, with the chemical industry's share possibly even higher than in 1958-1959. The U. S. space and weapons program is becoming a larger and larger factor to chemical manufacturers.

Structural Materials Largest Market

Where does the CPI fit into this vast undertaking? Structural materials are of course the greatest contribution in terms of tonnage and of dollars. Practical materials must be found to withstand temperatures as high as 7,000° F. Strength must be high. Weight must be kept down. The chemical industry is working on answers—evaluating nonferrous metals and alloys, ceramics, organic and inorganic polymers, graphites—developing new compounds, new techniques, new combinations.

in this area is enormous. The reason: none of the materials evaluated to date completely answer the requirements of the ideal propellant.

Liquid systems, on the one hand, are complex, and many of the component materials have the disadvantages of corrosiveness, toxicity, low density and, for ballistic purposes, poor storage life. However, liquids are relatively easy to control and, most important, have high specific impulse.

Solid systems, on the other hand, present problems of their own. Combustion control is difficult. Component materials need better physical properties such as flexibility and thermal expansion coefficients. Most important, they are low in specific impulse compared to liquids. But solid systems are reliable, comparatively simple equipment-wise, and can be fired easily on short notice.

In consequence, both types of systems are under intensive investigation, but with the emphasis on solids growing.

MORE ➤

Nonferrous Metals Used or Proposed For Structures in Missiles & Rockets

Aluminum	Nickel
Beryllium	Silver
Cadmium	Tantalum
Chromium	Tin
Cobalt	Titanium
Columbium	Tungsten
Copper	Zinc
Magnesium	Zirconium
Molybdenum	

Non-Metal Materials Used or Proposed For Structures in Missiles & Rockets

Alkyds	Aluminum Oxide
Epoxies	Glass
Fluorocarbons	Graphite
Phenolics	Nickel Molybdate
Polyamides	Silicon Carbide Cpd.
Polybutadienes	Thorium Oxide
Polyesters	Zirconium Boride
Polyulfides	Zirconium Oxide
Silicones	Other Ceramic Oxides
Urethanes	

Along with combinations of metals and ceramics (ceramets), researchers have recently proposed metal-ceramic-plastic "alloys" which, if practical, might make the ideal rocket materials.

Propellents Greatest R&D Challenge

Propellant procurement is rather small since, of course, propellents are actually used only during firings. But the research effort

Liquid Propellant Materials, Used or Under Consideration

FUELS	OXIDIZERS
Alcohols	Chlorine Trifluoride
Alkyl Boranes	Fluorine
Amines	Hydrogen Peroxide
Aniline	Liquid Oxygen
Ammonia	Nitric Acid
Cyanogen	Nitrogen Tetroxide
Hydrazine	Oxides of Nitrogen, Other
Hydrogen	Oxygen Difluoride
Hydrogen Cyanide	Oxygen Fluoride
Kerosene	Ozone
Unsymmetrical Dimethyl Hydrazine (UDMH)	MONOPROPELLENTS
	Ethylene Oxide
	Hydrogen Peroxide

Solid Propellant Materials, Used or Under Consideration

FUELS	Polyethylenes
Boron-Based Compounds Containing Metals Like	Polyurethanes
Aluminum	Polysulfide Rubbers
Beryllium	OXIDIZERS
Magnesium	Ammonium Nitrate
Resins such as Acrylics	Potassium Nitrate
Butadiene-Vinyl Pyridine	Ammonium
Cellulosics	Perchlorate
Epoxy	Potassium
Phenolics	Perchlorate
Polyamides	Lithium
Polyesters	Perchlorate
	DOUBLE-BASED
	Nitrocellulose
	Nitroglycerine

June 20

1959

U.S.I. CHEMICAL NEWS

CONTINUED

Missiles**Many Other Types of Materials Needed**

The chemical industry also supplies to the missile field materials such as lubricants, hydraulic fluids, pressurizing gases, and plastics and rubbers for seals and gaskets and protective clothing. Of particular interest is the research work in progress on synthetic lubricants to supplement the mineral-based varieties. Among the compounds under investigation are included fluorine derivatives, diester derivatives, phosphorus-boron combinations, tin-silicon compounds, silicones and alkyl silanes.

U.S.I. Contributes in Several Areas

Because of its diversified interests in chemicals, plastics and nonferrous metals, U.S.I. contributes to the vital space and weapons program both directly and indirectly. Through 1/2 ownership of Mallory-Sharon Metals, U.S.I. supplies zirconium, titanium in commercial quantities, tantalum and columbium in pilot quantities. Polyethylene, made by U.S.I., is among the resins under investigation in solid propellant fuels. Another U.S.I. product, ISOSEBACIC® acid, may be used as an intermediate for the polyurethanes studied for the same purpose, as well as for diester bases in synthetic lubricants. U.S.I. makes ethyl alcohol, long used in liquid propellant systems. AFN, Inc., 25% owned by U.S.I., has a government research contract on boron-based fuels. And in a joint venture with Food Machinery, dimethylhydrazine-type fuels are being studied.

CONTINUED

Phosphoric

acidity — an important advantage.

- Allow formulation of high-analysis grades — a strong trend in the industry — because of high concentration.
- Granular goods are growing in popularity. PFS formulations generally give more rugged granules — better suited to subsequent handling — without adding granulation aids.

In summation Mr. Byck notes that because of transportation costs, PFS will probably be uneconomical in many areas. But in many more of the important agricultural areas, it is becoming the product of choice for reasons of product quality, overall costs and adaptability to process needs.

Faster Analysis Developed For Halogens in Organics

A researcher at the Texas Agricultural Experiment Station has worked out an improved method of the quantitative determination of halogens in organic materials. It is said to be faster, cheaper than previous techniques.

In a typical analysis, the chemist would weigh a sample containing about one milliequivalent of chlorine into a beaker, add excess ammonia to dissolve and chill the sample, and ethyl ether to insure that the sample stays in solution. Chlorine is then reduced to chloride with about half a gram of metallic sodium. Appearance of a blue color indicates complete reduction, which takes only about two minutes.

Ammonia and ether are evaporated, excess sodium combines with water vapor to yield sodium hydroxide, and the blue color disappears. Nitric acid is used for neutralization, and the chloride is titrated with silver nitrate.

As little as ten minutes of the chemist's full attention is devoted to a single analysis, and several analyses can be conducted simultaneously. Error is rarely higher than 3%.

New Extraction Process Purifies Many Elements

A new extraction process for purifying a large number of elements, including many not usually subject to extraction processes, is described in USP 2,874,176 issued recently. By this technique, elements can be separated selectively from an aqueous solution containing a mixture of elements.

Here is how it works. The various elements in the solution are reacted with an alkali metal salt of perfluorocarboxylic acid. From the resulting compounds in solution, the desired compound is selectively extracted with a substantially immiscible polar organic solvent such as an alcohol, ether, ketone or phosphate.

Extraction is reported to depend on a number of variables: chain length of acid, valence of cation, organic solvent, molar ratio of cation to reagent, ion size, complexing ability of cation and pH. For example, uranyl and vanadyl ions extract together at pH 2, but at pH 1.65, only uranyl ion extracts.

After separation of the desired element, the reactions can be easily reversed so that the element is once more in aqueous phase and the reagents are recovered.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Identification reagent for synthetic fibers, as well as for animal and vegetable fibers, can now be obtained. Claimed to give reliable identification in minutes by imparting distinct colors to different fibers.

No. 1480

New economical corrosion inhibitor for aqueous recirculating systems combines sodium molybdate with orthophosphate. Combination claimed to be synergistic — effective as the molybdate alone but at greatly lowered cost.

No. 1481

Automatic recording titrator now on market is designed to make variable and constant pH measurements automatically. Simultaneously provides permanent record. Titrant delivery rate and chart speed are both variable.

No. 1482

Corrosion and spotting preventive for all metals, recently developed, is added to hot water rinses. Said to promote spot-free drying, and to leave an invisible film which protects against tarnish and corrosion for months.

No. 1483

Volume I of new series of publications on advances in inorganic and radiochemistry can now be purchased. 449-page book contains sections on boron hydrides, lattice energies, activation analysis, phosphonitritic halides, etc.

No. 1484

Commercially-pure titanium anode hooks and baskets, designed to meet need for high corrosion resistance in nickel and chrome plating operations, are now on market. Said to have indefinite life in highly corrosive mixtures.

No. 1485

Selective reductions of organic compounds with complex metal hydrides are discussed in new brochure now available. This review of published literature covers types of reactions possible, includes bibliography.

No. 1486

Polyethylene aspirator pump now on market cannot corrode; said to perform as capably as metal aspirators, operate efficiently on all water pressures from 11 pounds up. Recommended for highly corrosive filtrates.

No. 1487

Physical and thermodynamic properties of many commonly-used elements and compounds are covered in new brochure offered by catalyst maker, to aid in catalyst selection when factors of equilibrium, heat exchange, etc. are vital.

No. 1488

Thorium technology is discussed in series of papers now bound in 397-page volume and offered for sale. Topics include melting, refining, structure, properties, fabrication, corrosion, production of compounds.

No. 1489

PRODUCTS OF U.S.I.

Alcohols: Ethyl (pure and all specially denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Oortho-Chloranilide, Acetoacet-Oortho-Toluclidine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

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Smooth Sailing: And the future of shipping, and of marine chemical specialties, is growing brighter. Here's why: The U.S. Lines, for example, will build 46 new cargo ships. Also, there will be two new "Queen" class liners built by Great Britain. The French, too, will have a new flagship to replace the *Île de France*. And there are plans, a New York hotel owner says, to build a 10,000-passenger liner. These construction projects, plus those for various tankers, indicate that marine specialty makers should have smooth sailing ahead.

New Aerosols Group

The Packaging Institute (342 Madison Ave., New York) has just organized an aerosol committee to aid users of packaging materials and machinery. Current chairman of the new committee is Fred Pickerell of Schering Corp. Permanent officers will be elected in August.

Some objectives of the committee: development of definitions and nomenclature of the component parts of the aerosol package; establishment of standards for each of these parts; development of effective test procedures for evaluation of the component parts; and cooperation with other organizations concerned with aerosol propellents and aerosol filling.

The first regular working meeting of the group will be held during the Packaging Institute's National Packaging Forum, scheduled for Nov. 16-18 at the Statler Hotel in New York.

PRODUCTS

Aerosol Valves: Risdon Mfg. Co. (Naugatuck, Conn.) has issued a 16-page booklet describing its line of valves and containers.

Antistatic Checklist: Chemstrand Corp. (New York) has put together a list of 70 antistatic finishes meeting its approval for use on fabrics made of Acrilan. The list also indicates methods of application of the antistatic agents.

Adhesives for Polystyrene: B. F. Goodrich (Akron, O.) has developed

world's smallest corral
for 200 horses*

(*horsepower, that is)

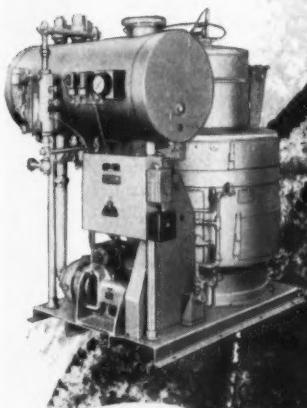
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Material	Solvent	Temp. °C.	Half Life in Hours
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Benzoyl Peroxide	Benzene	100	0.33
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Benzoyl Peroxide	Benzene	70	12

ALPEROX C (Technical Lauroyl Peroxide) is the preferred catalyst for the suspension polymerization of vinyl chloride. Concentrations of 0.1 to 1.0% confer greater heat stability on the final product and facilitate higher conversion velocity. As a catalyst for curing polyester resins, it is especially applicable to the production of small, clear, transparent castings, setting at a temperature of 60° to 80°C. For cold setting with tertiary amines as accelerators, less discoloration occurs than when using benzoyl peroxide.

WRITE FOR DATA SHEET No. 3

LUCIDOL DIVISION



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SPECIALTIES

two new adhesives for polystyrene: A-827-B RO foam-in-place polystyrene and R-1083-T for prefoamed polystyrene.

Latex Floor Paint: Four colors of a new synthetic latex paint called Florhide Latex Floor Paint, for concrete floors, walls and other interior and exterior applications, has been added to Pittsburgh Plate Glass Co.'s line of finishes. It is packaged in quart and gallon containers.

Food for Bacteria: A new bacterial food for the vinegar industry, trademarked Amber BYF, is now available from Amber Labs., Inc. (3456 North Buffum St., Milwaukee). Amber BYF contains water-soluble peptones, peptides and amino acids, plus all the B-complex vitamins. Total nitrogen content is over 9%, of which 35% is amino nitrogen. Price range: 27.5-50¢/lb., depending upon quantity of material ordered.

Nonfoam Anionic: Petrochemicals Co. (1825 East Spring St., Long Beach, Calif.) has a new, nonfoaming, anionic surfactant called Petro-Ad Special. It's recommended for applications involving high temperatures and agitation in the presence of electrolytes.

Spray-On Starch: Cosmopolitan Commodities Co. (1513 Jefferson Ave., Toledo, O.) is marketing an aerosol starch. Cosmopolitan says its new product may be sprayed directly on dampened clothing, that clothes may be ironed immediately.

Controlled Vitamin: Ayerst Labs. (New York) is out with S. A. Vite, a sustained-action (controlled-release) multivitamin tablet.

Cationic Softeners: Two new cationic softening agents, Atcosoft XP and Atcosoft RO, are now available from Metro-Atlantic, Inc. (Centredale, R.I.). Atcosoft XP may be used along with thermosetting resin finishes; Atcosoft RO is an all-purpose softener for use on wool, silk, Orlon, nylon, Dacron and other synthetic fibers.

Textile Wax: Textile Chemicals, division of L. Sonneborn Sons, Inc. (New York), has a new microcrystal-

COLORLESS

at the start

COLORLESS

in the finish



Sucrose Acetate IsoButyrate (SAIB) is a most unusual compound of immediate interest to all who are concerned with the formulation or performance of plastic materials, lacquers, hot melts or other protective coatings.

Consider these characteristics:

Its color and clarity are a sparkling water-white.

Its color stability on exposure to ultraviolet light is excellent.

Its color stability on prolonged heating is excellent. Example: samples heat-aged 6 days @ 350°F showed only a 9 Gardner color change, from 1 to 10.

Its color stability in the presence of other lacquer ingredients is excellent. Example: in metallic pigmented lacquers, SAIB does not produce a "greening" effect with bronze powder.

Lacquer film formers highly modified with SAIB show unusually good film tensile properties and hardness. The low solution viscosity of SAIB permits formulation of *high-solids lacquers* at application viscosities. As a result, greater coverage per gallon of lacquer is achieved and solvent requirements are reduced. Formulating is simplified, too, through replacement of several lacquer-modifying components with SAIB. Film adhesion and permanence is improved in many cases.

To see how easy SAIB is to use, and how little it affects film properties while increasing solids content, add it to your present lacquer—try 5 to 10% by volume of total lacquer to start with—spray it, and observe the result.

In *hot melt-peelable plastic formulations*, SAIB greatly extends the basic film former. Serving as a solubilizer, it enables the formulator to use increasing

Sucrose Acetate IsoButyrate, new resin modifier-extender, exhibits low color and excellent color stability

amounts of mineral oil. Because of SAIB's low volatility, there is no fuming of hot melts, even at temperatures up to 350°F. Modification with SAIB also lowers the operating temperature of hot melts.

Recent tests show its use with plasticizers improves the permanence and forming properties of *molding and extrusion compounds*, such as those based on cellulose acetate.

Few commercial compounds so high in molecular weight display so compact a structure. The outstanding stability characteristic of SAIB is attributed to this dense molecular configuration.

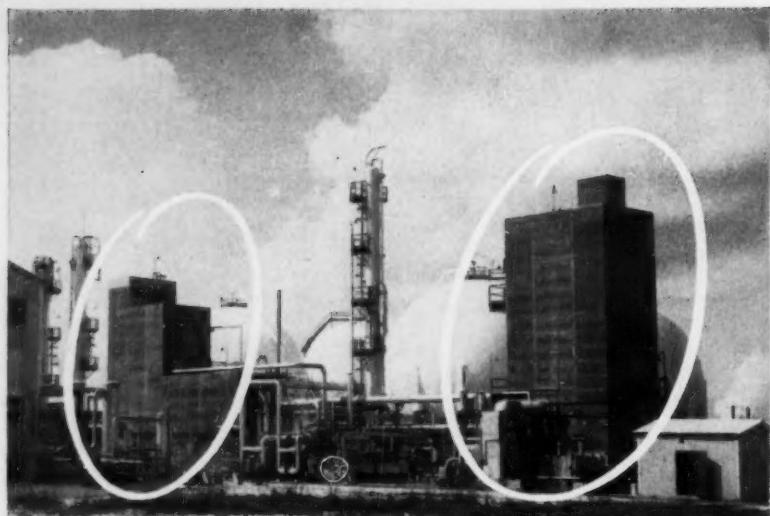
Another unusual property of SAIB is its extremely high viscosity at room temperature and sharp decrease in viscosity with the addition of heat or solvents. At 30°C, its viscosity is about 100,000 centipoises. At 100°C, the viscosity drops to 90 centipoises. Indicative of its solubility is the fact that a 90% solution of SAIB in Tecsol®, Eastman proprietary ethyl alcohol, exhibits a viscosity of only 750 centipoises at 30°C.

For convenience in formulating, SAIB is sold both as a 90% low-viscosity solution, designated *SAIB-90* and as a 100% concentrate, designated *SAIB*.

Many other applications for SAIB are being investigated by the Eastman Customer Service Laboratories. May we help you in evaluating this unique material in your product? For this service or for a sample of SAIB, write to Chemical Sales Development Department, Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tennessee, or contact the Eastman sales office nearest you.

SAIB
SUCROSE ACETATE ISOBUTYRATE

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE subsidiary of Eastman Kodak Company



Part of the Petroleum Chemicals Inc. installation at Lake Charles, La., showing the two Air Liquide units mentioned below.

Roy Trahan photo

Low-temperature separation at its best!

The large and complex project of Petroleum Chemicals Inc. and Calcasieu Chemical Inc., at Lake Charles, La., is typical of the wide scope and adaptability of low-temperature gas separation.

At the P.C. ammonia producing plant, a raw hydrogen feed stream containing platformer, butadiene, hydroformer and ethylene cracking off gases, is treated by an Air Liquide low-temperature nitrogen scrubbing unit. It is the largest of its kind to handle such a variety of feed streams.

The resulting ammonia synthesis gas, in correct hydrogen-nitrogen ratio and containing less than 20 ppm of total impurities (CO + Oxygen), is rated at the ammonia equivalent of 310 tons per day. Pure nitrogen for the ammonia and for the liquid nitrogen scrubbing is produced in an Air Liquide air separation plant rated at 100 tons of oxygen per day. Both units will maintain the same product purities even at 60% capacity.

The Calcasieu Chemical plant, with an Air Liquide 180-ton-per-day oxygen unit, uses the gas directly to manufac-

ture ethylene oxide. This unit, differing from the conventional design, is a low-pressure regenerator type producing at the required pressure of 225 psig using liquid oxygen pumps. This special Air Liquide cycle eliminates the problems of oxygen compressors and results in a safe plant with lower power consumption and good process control.

Behind these achievements is more than half a century of design and engineering experience which can help you solve your own low-temperature problems.

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- Hydrogen liquefaction.
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SPECIALTIES

line wax (Sonowax 3450) for use in textile wet processing.

Reactive Brown: Ciba Co., Inc. (New York), has a new dye called Cibacron Brown 3GR. It's claimed to be the first reactive brown on the market.

Detergent in Soluble Pouches: Techno-Economic Services, Inc. (Los Altos, Calif.), is marketing Toss detergent in water-soluble (polyvinyl alcohol) film. Each carton of detergent contains a dozen 2-oz. pouches.

Acne Treatment: C. H. Boehringer Sohn (Ingelheim am Rhein, Germany) has developed a product, Thiocarbin, said to be a highly effective anti-seborrheic agent.

Synthetic Musk: Polak's Frutal Works (Middletown, N.Y.) offers a synthetic musk for improving existing scents and as an ingredient for new odor compositions. Called Tonalid, the product chemically is 1,1,2,2,3,3,5-heptamethylindane-6-methyl ketone. It's a white powder, sells for \$28/lb.

Poison Ivy Treatment: Rowell Laboratories (Baudette, Minn.) has developed a product, Residerm, which uses an ion-exchange process to combat poison ivy. The exchange resin is designed to convert the irritating ivy phenol to an inactive, nonirritating phenolate, which can be washed from the skin.

Hosiery Finish: W. F. Fancourt Co. (Philadelphia) has introduced V-12, a new hosiery finish, said to produce good dulling and delustering qualities to give a matte finish to hosiery.

Stabilizer: Nuodex Products Co. (Elizabeth, N.J.) has developed Nuostabe V-134, a barium-cadmium complex stabilizer. It's for use in calendering plastisols and organosols, and for extrusion- and injection-molding and solution formulations.

Fabric Market: Speedry Products Inc. (Box 97, Richmond Hill, Jamaica, N.Y.) has developed a fabric marker said to be suitable for all natural and synthetic fibers and fabric, even those treated with waterproof and stainproof finishes. It's called Textile Magic Marker 83.

1959

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S	M	T	W	T	F	S
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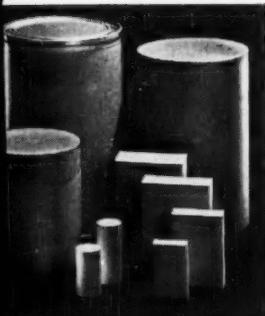
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M A R K E T S

Problem Time for Petrochemical Previewers

The recent World Petroleum Congress brought out scores of petrochemical market-data hunters — all gunning for mid-'60 targets and, for the most part, scattering their shots. Case in point: polyethylene. Three studies (see graphs) made in recent weeks have resulted in three markedly different forecasts.

The differences mainly reflect different perspectives.

At a recent New York meeting of the Chemical Market Research Assn., Union Carbide Plastics' Arnold Sward "conservatively" predicted that U.S. polyethylene demand would reach 2.15 billion lbs. in '65. At the same meeting, market analyst Robert James of Arthur D. Little came up with a far lower estimate of 1.2 billion lbs. in '64 (extrapolated to 1.28 billion, in '65, for purposes of comparison).

The seeming 870-million-lbs. discrepancy is partly a matter of definition. Sward's definition parallels U.S. Tariff Commission plastics terminology—i.e., all materials containing 50% or more PE are considered "polyethylene" and are included in the total, no effort being made to adjust to a 100% PE basis. James' forecast, on the other hand, was based on 100% PE.

This helps reconcile the Sward and James predictions—but it does not make them agree.

Moreover, there's a considerable difference between James' 1.2-billion-lbs. forecast for '64 (extrapolated to 1.28 in '65) and 1.7 billion lbs. production in '65 recently predicted by CW (*CW Report*, May 9, p. 79).

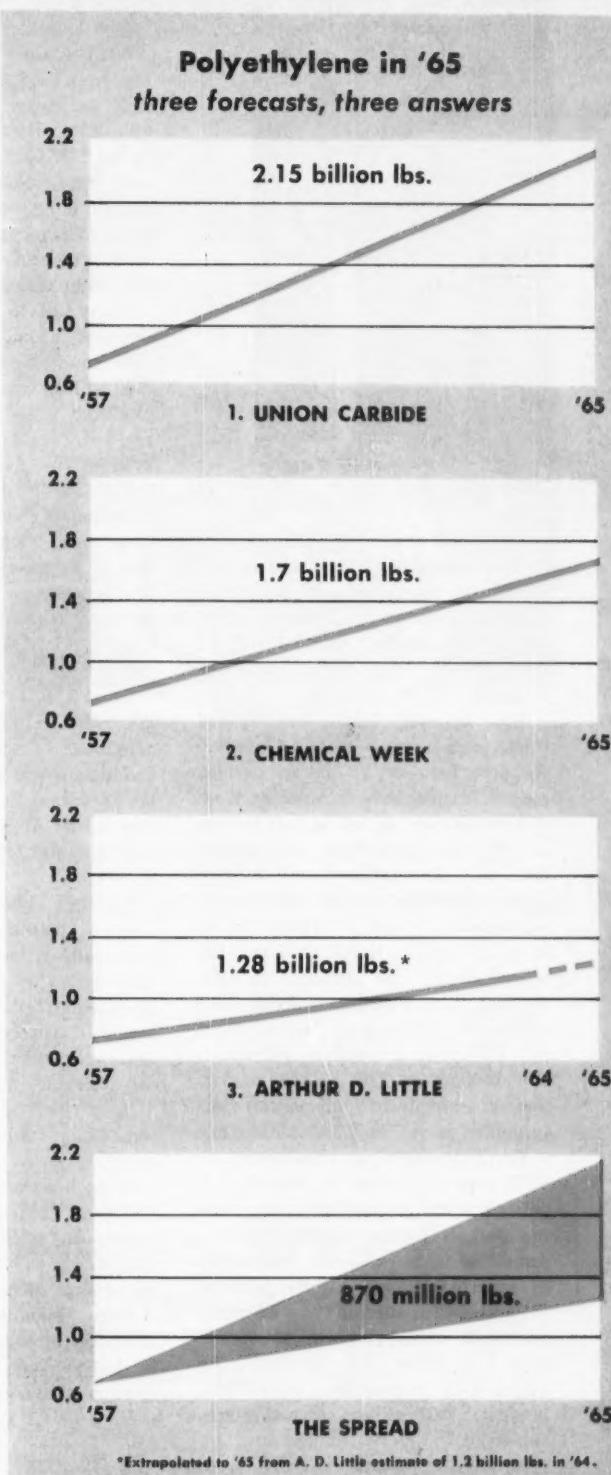
Broader Aspects: Even on more general aspects of petrochemical growth, there is considerable disagreement.

Take, for example, the nature of the competition petrochemical producers will face. James notes that "most of the competition received by a particular petrochemical comes from another petrochemical."

This view is echoed by J. H. Forrester of Amoco Chemicals, who (at a recent New York meeting of the American Petroleum Institute's division of refining) said: The displacement of products of other origin has been one reason for past rapid growth of the petrochemicals industry. The cream has been skimmed from this area of growth.

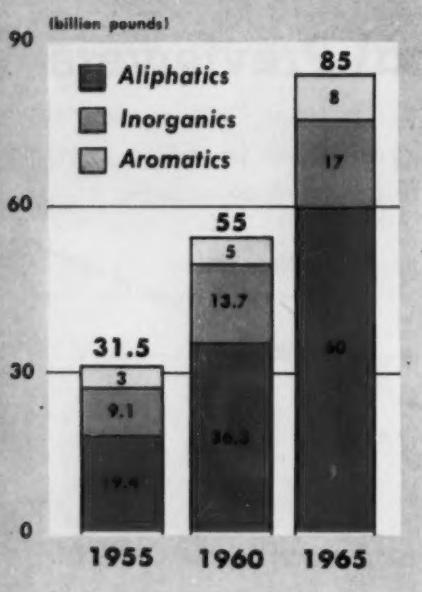
"Competition in the future will be mostly intra-industry. . . . The winners will be those who develop more efficient processes or more advantageous petroleum raw-material situations."

An apparently opposite opinion was stated by Jerry McAfee of Gulf Oil, sponsoring director of the technical sessions at the fifth World Petroleum Congress held in New York's Coliseum. McAfee predicted that petrochemicals would further replace natural products, just as "nylon has largely replaced silk, and as other synthetics are replacing wool."



MARKETS

U.S. Petrochemical Output



How Much by '65? How fast will individual products, and the petrochemical industry as a whole, grow during the next few years? Plenty of answers are being offered, although comparisons are difficult.

For example, here's how Sward thinks consumption of major plastics will grow between '58 and '65: surface coating materials will increase from 478 million lbs. in '58 to 740 million in '65; celluloses, from 141 million lbs. to 173 million; polystyrene, from 695 million to 860 million; coumarone-indene and petroleum resins, from 237 million to 350 million; phenolics, from 461 million to 600 million; urea-melamine, from 324 million to 440 million; vinyls, from 821 million to 1.4 billion; polyesters, 114 million to 230 million in '65. Sward's estimate of total plastics consumption in '65 is 8.052 billion lbs.

Forrester offers an "optimistic" 8-10% year prediction of over-all U.S. petrochemical growth during the coming decade. James, however, gives a somewhat more detailed breakdown of expected volume growths between '57 and '64 for specific types of petrochemicals: methane chemicals, up at least 3.1 billion lbs.; ethylenes, 3.5 billion lbs.; propylenes, 760 million; butylenes, 900 million; "newer petrochemicals," 300-500 million lbs.

Aromatics Potential: At the recent

International Petroleum Congress, a group of Humble Oil market analysts* spelled out the potential importance of aromatic petrochemicals—still a minor part of the total petrochemicals business.

The Humble analysts noted that in '57, total aromatic chemical production from coal amounted to 2.4 billion lbs., and from petroleum about 3.5 billion lbs. (Because of its dependence on coke production, as determined by steel output, coal-tar aromatics production is held to relatively fixed volumes that are substantially below the volume of aromatics potentially available from petroleum.)

According to the Humble analysts, aromatic chemicals potentially available from petroleum are: benzene, 12 billion lbs./year (852 million were produced in '57); toluene, 25 billion lbs./year (1.12 billion in '57); and xylenes, 30 billion lbs./year (830 million lbs. in '57).

By comparison, coal, "provided all were coked," would yield about 4 billion lbs./year of benzene (nearly 1.6 billion lbs. were produced in '57); 1 billion lbs./year of toluene (310 million in '57); and 300 million lbs. of xylenes (96 million lbs. in '57).

Total U.S. petrochemical output in '55, the Humble analysts said, amounted to some 31.5 billion lbs. Production will increase to an expected 55 billion lbs. in '60, and 85 billion in '65. Aliphatics will continue to take the bulk of the business (*chart, p. 84*).

Aromatic chemicals — especially aromatic petrochemicals—are derived principally from benzene. Toluene is used primarily for manufacture of TNT. In fact, it is this large explosives use that has kept a lid on use of toluene in other applications. Reason: the chemical has been regarded as a "war risk" by potential users who were wary of being caught in short supply.

Now, however, the increased availability of toluene and the lessening importance of TNT as a military explosive should help boost toluene's importance as a basic chemical.

Price Inducements: Future consumption of toluene and xylenes will be largely determined by price. At a recent meeting of the American Coke and Coal Chemicals Institute,

R. A. Erickson of Universal Oil Products pointed out that petroleum-derived toluene was selling for premium prices during the war years, but as productive facilities expanded cost reduced to levels comparable with that of coke-oven toluene.

Petroleum-derived toluene is now selling for about 25¢/gal. The price history of xylenes is similar; increased production has permitted lowering of prices to 28¢/gal. These prices favor increased use, especially in light of current cost of benzene—now about 31¢/gal.

There's no dispute among chemical and petroleum industry experts that the petrochemical industry will grow. Whether it can maintain the pace of recent years, however, is debatable.

Says Forrester: "One disproportionate influence favoring the past decade is the exploitation of technology stored during war years. New product developments of the past decade have set an awesome pace for the next to challenge."

But Forrester also notes—and others will no doubt agree—that none would be "foolish enough to forecast that the petrochemical industry has passed its crest. . . ."

Brighter for Paint

Paint markets are looking brighter all the time. Total sales of paints, varnish and lacquer set new records in '58—about 1% higher than in '57. Now, trade reports are that '59 is already racking up substantial sales gains over '58.

According to data just released by the National Paint, Varnish and Lacquer Assn., total sales value of these materials amounted to \$393 million in first-quarter '59, compared with \$341.7 million in the same period of '58—an increase of about 15%.

Sales in March '59—most recent month for which statistics are available—reflect an even better outlook for the industry. Value jumped to \$148.8 million, 24.4% higher than in Feb. '59 and 26.7% higher than in March '58.

Lacquer Leaps Most: By far the biggest percentage sales increase was scored by industrial lacquers; three-month sales in '59 amounted to \$47.4 million, 39% more than the \$34.1 million in '58. The month-to-month comparison: \$16.7 million in March

*H. W. Earhart, R. L. Heinrich, E. W. Lewis, T. M. Newsom, E. F. Wadley.



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Nalcamine IDEA LIST



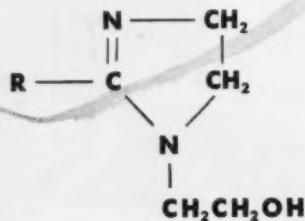
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Nalco
CHEMICALS

MARKETS

'59, 46.6% more than in March '58.

Relatively small—but nonetheless significant—increases were made in sales of industrial paints and varnishes. The \$108-million sales value in first-quarter '59 represented a 4.9% gain over the same period last year. March sales alone amounted to \$40.7 million, 20.3% more than in March '58.

Total trade sales of all these materials also gained significantly this year, reaching a \$237.6-million total sale value in three months, 16.1% more than the near-\$204.7 million in the same period of '58. The latest monthly score for trade sales: March '59, \$91.4 million, 26.6% more than in March '58.

Actual production volumes during March worked out like this: production of all materials amounted to 57.6 million gal., of which trade sales represented 31.7 million gal. and industrial sales 25.9 million gal. The industrial total further breaks down into 18.4 million gal. of paint and varnish, 7.5 million gal. of lacquer.

Potash from Utah?

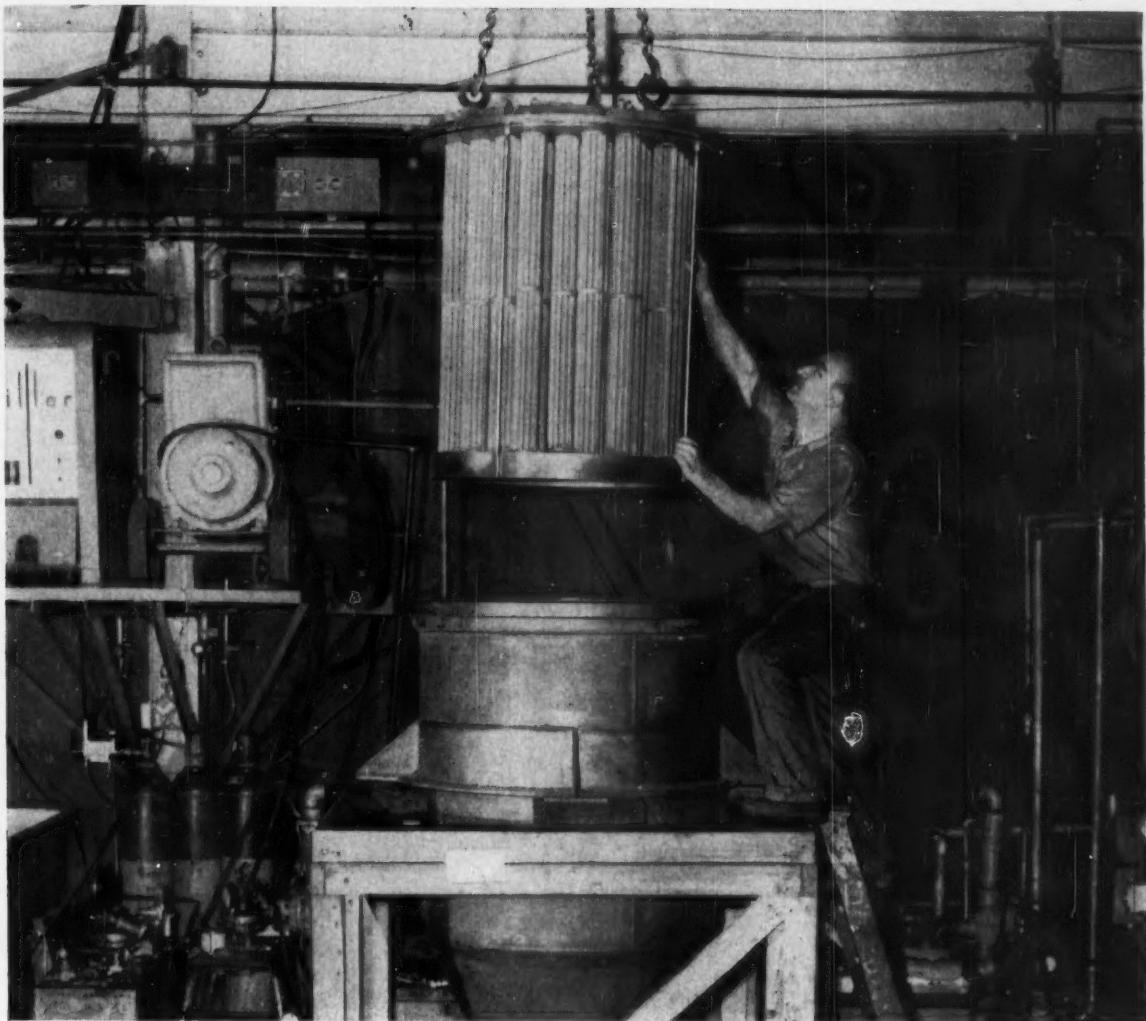
Delhi-Taylor Oil Corp. reports it is "reasonably near" a deal with one of two major chemical firms for a partnership arrangement to tap vast potash reserves at Cane Creek Anticline in Grand County, Utah.

Who the prospective partners are isn't yet revealed, but trade observers are laying odds on Duval Sulphur and Potash or Texas Gulf Sulphur, both of Houston, Tex. (Potash Co. of America, a Denver-based company that produces potash at Carlsbad, N.M., and in Canada is also said to have investigated at the Crane Creek prospect in the Colorado.)

Meanwhile, Delhi-Taylor is credited with drawing up fairly specific plans to build a \$20-23-million mine and treatment plant that could process 1,500 tons/day of potash crude for more than 40 years.

Early indications are that beneficiated potash would be hoisted from the mill in the Colorado gorge to nearby Bartlett Mesa; from there it would be hauled by a newly constructed spur of the Denver & Rio Grande Western Railroad to the main line near Green River for shipment to points east.

Reports are that Delhi-Taylor and /-



Built to withstand highly corrosive fluorine-containing gases, Monel nickel-copper alloy porous sintered filter elements

are lowered into shell. Entire unit, including housing was constructed by Purolator Products, Inc., Rahway, N. J.

Filters most corrosive element known ...with porous sintered Monel

This filter reclaims solid particles from a gaseous stream containing fluorine — the world's most reactive element. It's made of porous sintered Monel* nickel-copper alloy, stands up in fluorine service much longer than filters of other materials. Housing and cover are Monel, too.

Porous metal filters of Monel and other Inco Nickel Alloys are proving invaluable wherever corrosion, cyclic shock, heat or radioactivity must be reckoned with. They're made with pore sizes from 50 down to 0.2 microns, $\pm 10\%$.

For high-temperature filtering . . . particularly above 1000°F, porous sintered Inconel* nickel-chromium alloy is used . . . for filtering such materials as molten sodium and potassium and removing catalyst particles from gaseous products of catalytic cracking units.

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MARKETS

or successor in interests to the potash prospect would initially own the railroad, would eventually turn it over to D&RGW under terms of transportation contracts now being drawn up.

How would Utah-mined potash stack up competitively with material originating in New Mexico or Canada? Delhi-Taylor's marketing experts declare it could match most other Western potash in price.

There's no official word yet when the yet-to-be-formed partnership is likely to get the project under way, but CPI observers in the Intermountain area are guessing a start will be made in '60.

Elastomer Sales Slip

Total U.S. output of all types of elastomers amounted to about 2.2 billion lbs. in '58, slightly below the 2.35 billion lbs. turned out in '57, according to preliminary data issued by the U.S. Tariff Commission.

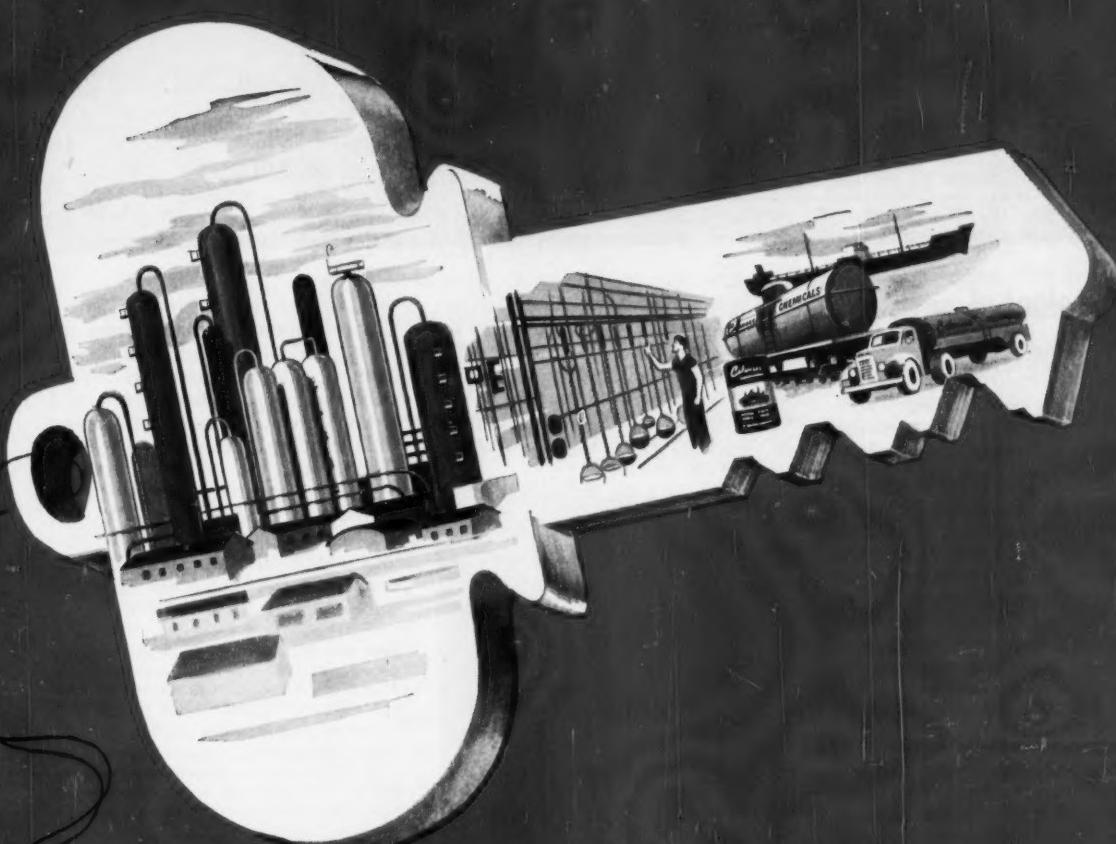
The Tariff report—virtually complete—gives a detailed breakdown of the '58 elastomer market. Total '58 elastomer sales were about 2 billion lbs., valued at \$544 million—compared with nearly 2.1 billion lbs., worth \$577 million, reported for '57.

Production of cyclic elastomers, consisting chiefly of polybutadiene-styrene-type (S-type) materials, amounted to 1.75 billion lbs. in '58, compared with 1.85 billion lbs. in '57. Sales amounted to 1.55 billion lbs. (worth \$362 million) vs. 1.62 billion lbs. (\$390 million) in '57.

Production of acyclic elastomers (including neoprene, butyl, N-type, silicone and others) added up to 449 million lbs. in '58, compared with 503 million lbs. turned out in '57.

Sales of these products in '58 totaled 454 million lbs., worth \$182 million—somewhat less than the 479 million lbs., worth \$187 million, sold in '57.

The detailed production breakdown for acyclics (elastomer-content basis): polybutadiene-acrylonitrile-type (N-type), 71.6 million lbs. (sales 61.8 million lbs.); polychloroprene-type (neoprene), 219.1 million lbs.; polyisobutylene-isoprene-type (butyl), 117 million lbs.; all other acyclic elastomers (including natural rubber modifications, silicone types, polybutadiene, etc.), over 41.6 million lbs.



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Progress Report...

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A new alcohol with great reactivity

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CARBIDE's primary amyl alcohol consists of approximately 60% pentanol-1, 35% 2-methyl butanol-1 and 5% 3-methyl butanol-1. There are no lower molecular weight molecules, no residual chlorine, and no secondary or tertiary alcohols. That's why it is so ideal where lower volatility, greater reactivity, and increased efficiency are needed.

Primary amyl alcohol is useful as an intermediate for ore flotation reagents, plasticizers, di-ester-type lubricants, fuel and lube oil additives, resin catalysts, vinyl stabilizers, corrosion inhibitors, and surface-active agents. It can be the reaction solvent in preparation of penicillin salts, and a wash in their purification. This mixed isomer also is used as a coupler and latent solvent for nitrocellulose lacquers.

In contrast to secondary alcohols, primary amyl alcohol reacts readily with carbon disulfide and sodium or potassium hydroxide to form primary amyl xanthate . . . a powerful collector for concentrating sulfide minerals containing lead, nickel, zinc, iron, and copper.

Primary amyl nitrate prepared from primary amyl alcohol is an effective cetane improver for low cetane number distillates used as diesel fuels. It

can be used to make zinc dialkyl dithiophosphates that provide corrosion resistance and antioxidant qualities for crankcase oils and transmission fluids. In heating oils, as little as 0.10 per cent primary amyl alcohol reduces burner maintenance by controlling sludge formation.



Ester-type plasticizers for vinyl chloride resins can be prepared with primary amyl alcohol. It can also be used to produce diethyl phthalate or, with higher molecular weight alcohols, to prepare mixed alcohol phthalate plasticizers.

The potential uses of primary amyl alcohol are many. For example—it deserves study for use in preparing esters of 2,4-D and 2,4,5-T herbicides, and as a spreading agent for oil-emulsion insecticides. Oil-soluble primary amyl phosphates and phosphites derived from primary amyl alcohol should be

evaluated as catalysts in resin manufacture. Amines prepared from primary amyl alcohol are corrosion inhibitors, rubbers, agricultural chemicals, and surface-active agents. And, various esters of primary amyl alcohol lend themselves to use in perfumes and flavors.

CARBIDE's primary amyl alcohol is immediately available in tank cars or trucks, and in 55-gallon drums (carload or LCL lots). For more information, check the coupon for Technical Information Bulletin F-8517C.

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Primary amyl alcohol. F-8517C

1959 Physical Properties of Synthetic Organic Chemicals — a comprehensive description of the properties and applications of more than 400 CARBIDE chemicals.

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PROPERTIES . . .

Purity, as Primary Amyl Alcohol, wt. %	98.0 min.
Acidity, as Acetic Acid, wt. %	0.01 max.
Carbonyl, as C ₂ aldehyde, wt. %	0.20 max.
Water, wt. %	0.3 max.
Apparent Specific Gravity, 20/20°C.	0.8134
Boiling Point, °C.	
760 mm. Hg	133.1
Freezing Point, °C.	-90 (sets to glass)
Solubility in Water at 20°C., wt. %	1.7
Solubility of Water in 20°C., wt. %	9.2
Viscosity, cps.	
0°C.	8.5
20°C.	4.3
40°C.	2.4

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Technology Newsletter

CHEMICAL WEEK

June 20, 1959

Sohio Chemical's acrylonitrile process is a one-step route, according to a report by Sohio, evidently triggered by the publication of the company's Belgian patent application No. 571,200 (*CW Technology Newsletter*, May 30). Anhydrous ammonia and air react with propylene when passed through a fluidized catalytic bed at temperatures under 500 C, pressures under 3 atm., to give acrylonitrile directly. Hydrogen cyanide—as well as acetonitrile—is produced in commercially usable quantities.

The company contrasts its process with those that proceed by oxidation of propylene to acrolein, subsequent ammoniation to acrylonitrile. It states firmly that another of its Belgian patent applications—one for producing acrolein from propylene and oxygen (No. 568,481)—has no connection with its system of acrylonitrile manufacture.

Sohio's plans for commercialization include a push outside the U.S. Economic studies have been made with Badger Mfg. Co. (Cambridge, Mass.) and its European counterpart, Badger, N.V. (The Hague). Verdict: The new process compares favorably with conventional routes in respect to investment, raw materials and operating costs, as well as product quality. And the new system is claimed to be economical for plants smaller than those using other processes.

The Russians have developed a new ethanolamine process that replaces conventional aqueous ammonia with nonaqueous liquid ammonia in the ethylene oxide condensation reaction. Main advantage: elimination of water-separation step. But the process also replaces the Soviet's old batch technique with continuous operation.

The condensation reaction takes place at 120-130 C and about 1,500 psi. Reaction time is 15-20 minutes. Yield of primary and secondary amines is controlled by conventional techniques: (1) varying the ratio of ammonia and ethylene oxide; (2) recycling one of the amines to repress the formation of the added amine in the condensation step.

Escambia Chemical's methacrylic acid and methacrylates process (*CW Technology Newsletter*, Aug. 23, '58) is now on the way to commercialization. A large-scale pilot plant and a full-scale unit are being designed. Escambia holds two U.S. patents (2,847,453 and 2,847,465) of importance in methacrylic manufacture. They deal with the oxidation of isobutylene with oxides of nitrogen.

In another area, the company is working with several large foreign chemical makers, who are pilot-planting Escambia-researched propylene oxide and acrylonitrile systems. Escambia's U.S. patent 2,847,464, which deals with the oxidation of propylene with oxides of nitrogen, is believed to be a key. The company says this work is expected to lead to the construction of plants by Escambia or process licensees.

Technology

Newsletter

(Continued)

Sterling Drug's Zimmermann process has won a commercial berth in a 200-tons/day waste disposal plant contracted for last week by the Metropolitan Sanitary District of Greater Chicago. Pilot operation of the wet-oxidation process for more than a year at the Sanitary District's West-Southwest Treatment Works (*CW Technology Newsletter*, Sept. 28, '57) proved it to be superior to, and more economical than, conventional waste disposal methods. The new installation is scheduled for completion and testing (except for power generating equipment) within 18 months, will handle about one-quarter of the waste treated at the site. Sterling has an \$11,870,000-contract covering the design, engineering, construction and startup of the plant.

A new way to kill nematodes and fungi in citrus soil—long-standing problem of citrus growers (*CW, Target, April 16, '55, p. 70*)—has been worked out by University of California (Riverside) researchers. It's costly (\$400-500/acre) but effective, consists of surface application of Union Carbide Chemical's Mylone (chemically, 3,5-dimethyltetrahydro-1,3,5,2H thiadiazine-2-thione) at the rate of 400 lbs./acre, before seedlings are set out. Large-scale tests show the chemical gives complete kill of citrus nematodes in the top 4 ft. of soil. Small-scale tests indicate it is equally effective against *Phytophthora* fungi, which rot tree roots.

Three times more power per pound than any previous thermo-electric generator is the promise of a device described last week by Lieut. Gen. Bernard Schriever, head of the Air Research and Development Command. The unit weighs 40 lbs., has been dubbed TAP-100 (for terrestrial auxiliary power, 100 watts).

Westinghouse Electric Corp. (Pittsburgh) developed the unit for ARDC, is now working on an advanced version that will be fueled by long-lived radioisotopes. The present model burns propane gas, but can also utilize other fossil fuels, such as gasoline and kerosene. In missile applications, it's likely that the unit could utilize the heat of rocket exhaust gas as power source.

A new phosphoric acid process is slated for pilot tests by Mitsubishi Chemical, Mitsubishi Petrochemical and Tohoku Fertilizer in a \$139,000 plant now being built at Akita in northeastern Japan. It's the tower process, developed by professors Keiichi Murakami and Shoichiro Hori of Tohoku University. Though details of the new method are secret, it's claimed to produce phosphoric acid at lower cost, and with simpler equipment, than conventional processes, and to yield high-quality gypsum as a by-product. Some U.S. experts believe it may involve a counter-current treatment of phosphate rock to produce a very lean acid solution. And because raising acid concentration is a costly operation, chances are that the economic advantages claimed for the tower method depend on direct use of the product in fertilizer manufacture, and on sale of the by-product gypsum.



A tip on cellulose...

The meteoric rise of filter-tip cigarettes (from 9% of the market in 1954 to 45% in 1958) heralds another success story for versatile cellulose. Almost all cigarette filters use cellulose-based fibers in some form... in various degrees of fineness, packed tightly or loosely... crimped, twisted or grooved in different ways.

Buckeye is a major producer of highly purified, taste-free cellulose for companies which process it to the individual specifications of cigarette manufacturers. As industry's oldest producer of this miracle material from farm and forest, Buckeye has contributed to the research, development and refinement of many products... cellophane, textiles, tire cord, plastics, film, paper and cigarette filters.

If your product uses cellulose, or can be improved with cellulose, take a tip from Buckeye. Our technical personnel with their vast experience and knowledge of

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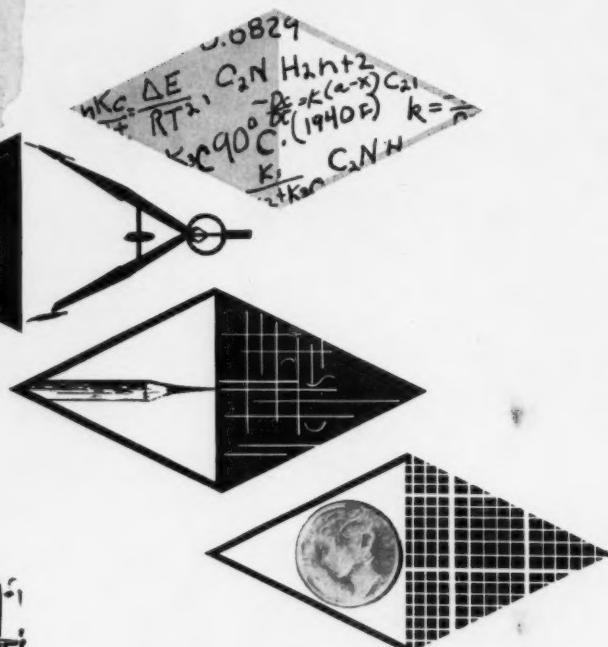
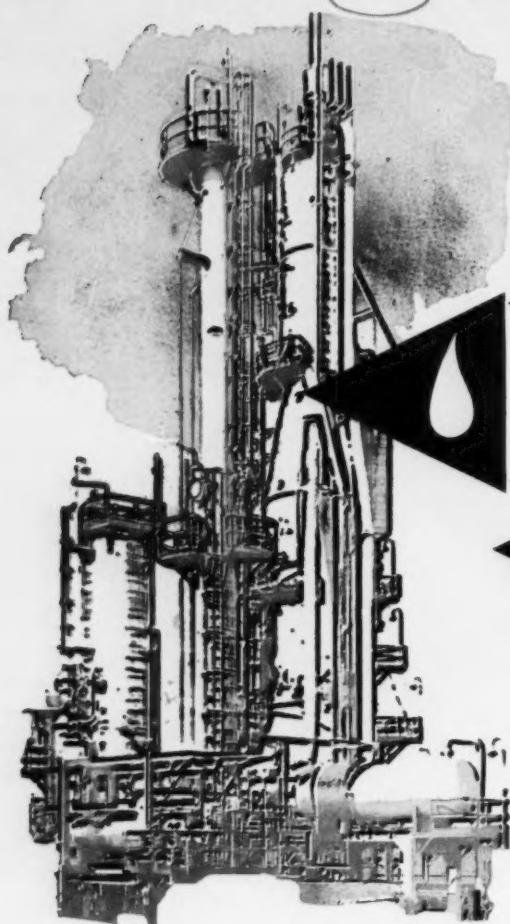
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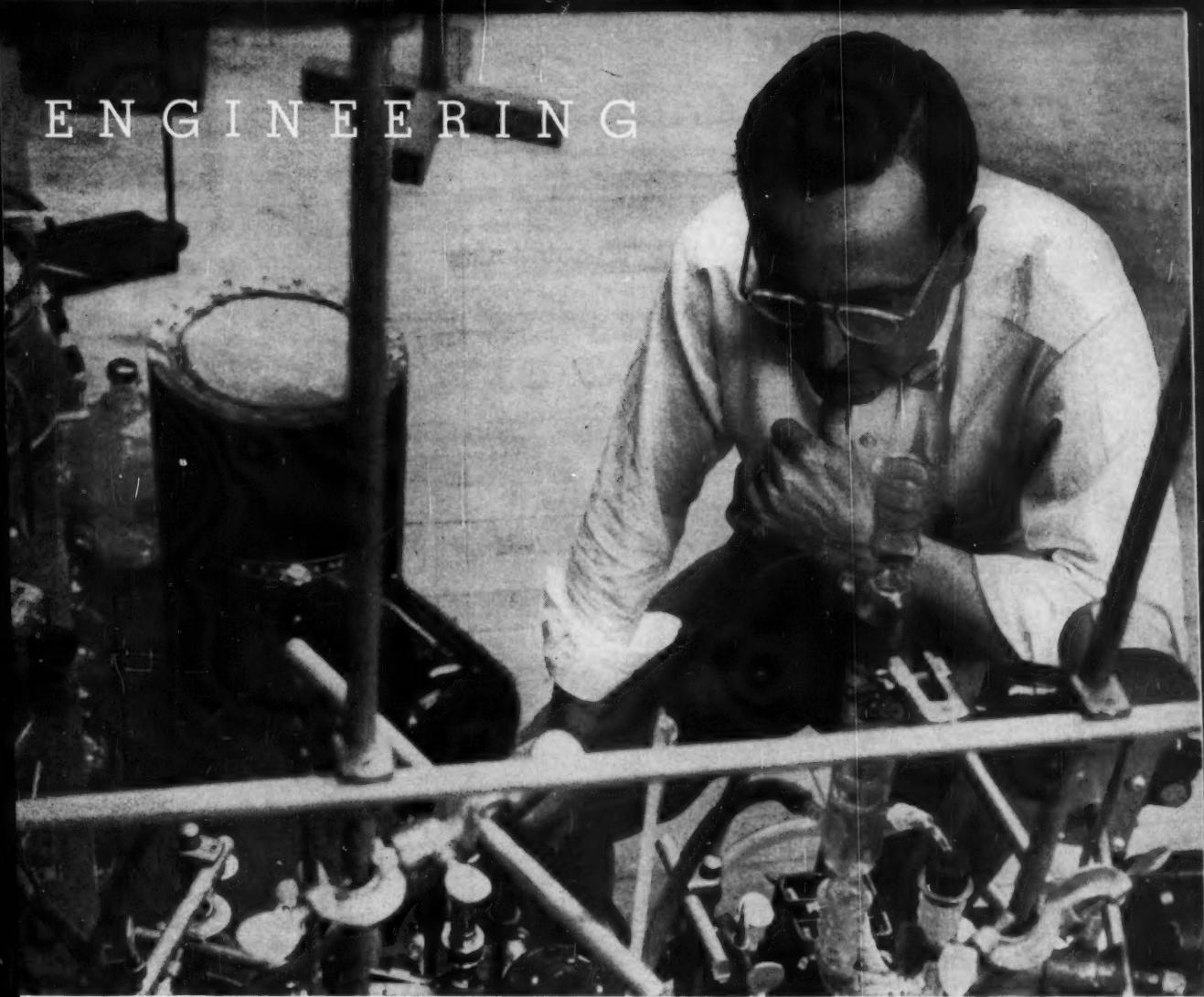
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ENGINEERING



CW PHOTO—JOAN SYDLOW

Study of crystallization fundamentals is one of Cyanamid's active engineering research projects.

When Does Engineering Research Pay Off?

Early this spring, American Cyanamid's engineering research group reported (CW, March 7, p. 96) its progress in crystallization research in a colloquium with other company personnel. Success of this work has prompted the firm to launch new studies, e.g., attaining and using ultra-high temperatures. The firm feels that research in chemical engineering can pay off handsomely if it is approached on an organized basis—as a formally designed project.

However, formal organizations for this purpose are much rarer in the CPI than are those devoted to scientific research. Among those where they're already established: American Cyanamid, Shell Development, Du Pont. But several other firms are said

to be in the process of setting up such groups.

The work of these engineers consists of both fundamental research and the solving of specific problems. Among the benefits to be reaped: exclusively designed equipment to meet specialized needs, closer control of plant operations, ideas for new processing techniques.

Newest of the three groups is Cyanamid's chemical engineering research section at the company's Stamford, Conn., central laboratories. In formal operation for about three years, the group consists of 15 researchers: two are physical chemists, the others are chemical engineers.

Some 90% of the group's efforts are of a fundamental nature. The re-

mainder — and it's a growing percentage — consists of planning and carrying out experiments to supply basic data requested by one of the company's other groups. Most often such information is needed either by the engineering and construction division to help in some design problem, or by the production analysis section, which works on the improvement of operations in the plant.

Shell Development has been at it for quite a bit longer, has a staff at the company's Emeryville, Calif., laboratories that handles from 100-450 problems a year. Nature of the work is split about evenly among basic research (called "scouting" by Shell), work on new scale-up and design methods, and consultations on process

ENGINEERING

development and operating problems.

The group is relatively young, strong in physical chemistry, physics and mathematics. New men are selected on the basis of intellectual aggressiveness as well as on interests, grades and recommendations. Aim: to provide men especially suited to the combination of research and problem-solving, which is the work of the group.

Du Pont is another CPI old-timer in organized engineering research. Through its development engineering division (part of the engineering department), Du Pont brings some 350 technical people to bear on the twin problems of conducting fundamental research and carrying out research and development on new operations and techniques.

Included in the division are an engineering research laboratory that studies engineering operations, process control and instrumentation, and materials of construction; a mechanical development laboratory that does mechanical engineering research and is responsible for developing specialized new equipment where commercial offerings won't do the job; and a two-year-old radiation physics laboratory that is carrying on fundamental studies in that field.

Fundamental First: Primary work of engineering research groups is fundamental research. Basic goal: to uncover general principles that can be applied in many situations throughout the company. Approach: to seek new knowledge rather than refinements of existing knowledge.

Highest-caliber talent is obviously needed for this kind of work, and it must be allowed the freedom that is so essential to its flourishing. On this point, Shell notes that it does not tell its researchers what to do, expects them to originate and pursue their own problems—"if we had to tell them, we wouldn't need them." However, as in any industrial research, the objectives of the group must be coordinated with the aims of the company, and guiding the work of the researchers without telling them exactly what to do is one facet of the business that is sometimes troublesome.

Projects for study are judged on such criteria as these: (1) degree of generality, (2) frequency of problems arising in the area of the subject and (3) the specific interests and experi-

ence of the researchers available.

Study of high rates of mixing and quenching, for example, is one aspect of Shell's basic engineering research. Fast reactions are studied in a chemical shock tube, where mixing rates are measured by a specially designed anemometer. In the case of reactions of commercial interest, the information gained from these studies can be used to help design test reactors suitable for subsequent scale-up to commercial size.

Typical fundamental studies that Du Pont has done or is now doing: fluid flow and heat transfer, boundary layer phenomena in fluid dynamics, factors contributing to wear.

Aid to Design: Engineering research groups can aid in the design of new processes and equipment in two general ways: by doing it themselves and by supplying the data for some other group. Du Pont's development engineering division, for instance, has come up with many specialized pieces of equipment to meet company needs. Example: a water-vapor analyzer that detects less than 1 ppm. of water, compared with the 10-ppm. limit of the then commercially available analyzers. The company doesn't enter the equipment-making business, though. Once it has perfected a new instrument or other piece of equipment, it works with outside firms to commercialize the item.

Shell's basic research in reactor design pays off in the plant with the most economical reactor for the job, developed with a minimum of pilot-plant experimentation. One result of this work is the consultation with Shell's Wilmington, Calif., refinery staff, which conceived a new reactor that boosted single-pass conversion of the company's butane isomerization process from 40% to 65% (*CW, Oct. 18, '58, p. 57*).

Shell's engineering research group generally enters the development of a new process very early in the scale-up stage. Once the chemical researchers have come up with a potentially commercial reaction, it's up to the engineers to find ways to cut out or minimize the number of intermediate pilot-plant steps. The generalized data supplied by engineering research helps to side-step the need for extensive experimentation at this point. The benefits are twofold: time is saved in com-

mercializing the process, and experimental work is not duplicated on projects based on similar principles.

Other Shell engineering research related to design includes studies of fluid mechanics, heat and mass transfer, especially in the case of two-phase flow; research in computing techniques aimed at developing a program for high-speed digital computers for optimum design of heat exchangers, distillation columns, reactors, other plant equipment. The results of many studies are summarized in basic data books for reference use throughout the company. Information — such as physical and transport properties, thermodynamic data, chemical and vapor-liquid equilibria and pressure-volume-temperature data — is compiled in these reference books.

Cyanamid's group enters into the design phase when requested to supply basic data for the engineering and construction division. In one case, the design engineers needed experimental data on gas absorption coefficients. The engineering research section worked out the experiments, found a suitable place to carry them out. This happened to be in a plant where similar operations were being run, so plant personnel took care of the actual performing of the experiments. Then engineering research took the raw data, analyzed it and sent the project's results on to the engineering and construction division, which put the information to work.

Captive Consultants: Work that is not generated by the engineering research group itself generally comes from one of the company's plants or other groups in the form of a problem on which the engineering research group serves as a consultant.

Cyanamid plants call on the production analysis section of the manufacturing service division's operations engineering department when it has a problem that can't be handled easily with available talent. This section, in turn, calls on the engineering research section to provide experimental data where needed.

Circumstances dictate the degree to which the engineering research group becomes involved. In one case, it ran a crystallization experiment in the plant, passed the raw data on to the production analysis section for solution of a filtration rate problem; in another, it offered the laboratory facilities and

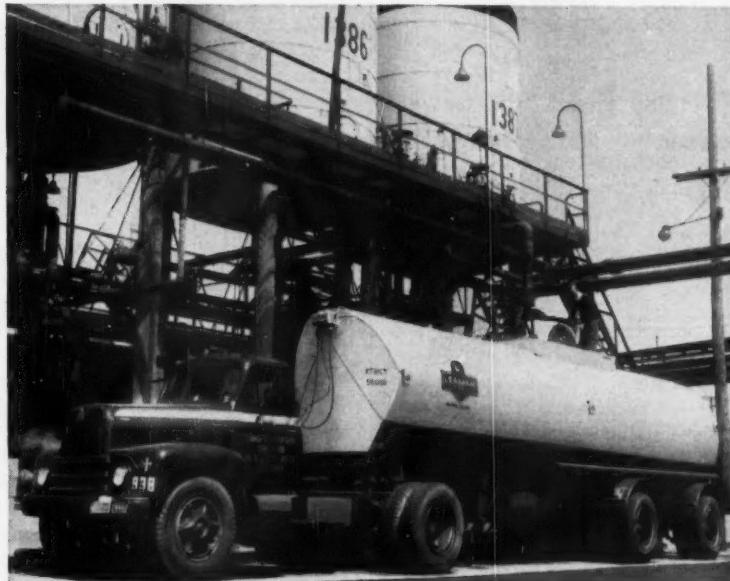
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Insulated Fruehauf Units Are Profitably At Work Hauling Dairy Wax, Edible Oils, Styrene, Animal Fats, Plasticizers, Caprolactum, And Countless Other Liquids!

Aluminum, steel, and stainless steel Fruehaufs are designed with special insulation and heating equipment for shipping liquids like those mentioned here at constant temperatures anywhere in the 150° range. Other units hold in-transit temperatures as high as 450°.

Liquid wax, being loaded in the photograph right, is among the many products of this type which are safely transported via Fruehauf Tanks. Soy bean oil, liquid shortening, phenol, glacial acetic acid, and many other commodities can be profitably handled.

Fruehauf precision manufacturing, which includes automatic welding of tank seams, produces units of the highest quality and safety. Consult Fruehauf first for dry bulk transports too.



ALUMINUM—Leaman Transportation Corp., an affiliate of Chemical Tank Lines, Inc., Downingtown, Pa., hauls liquid wax in this heated, insulated, conically shaped, clean bore aluminum unit. Leaman and affiliates operate in 34 states and Canada, hauling over one billion gallons of liquids annually.



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personnel to carry out experiments in figuring the accuracy of transfer functions for composition changes in distillation columns — information that was needed by the production analysis section to modify a production control system.

Most of the instruments designed by the Du Pont group are in answer to some plant problem. (The water-vapor analyzer was designed for better control in the production of Freon fluorocarbons.) And many other plant problems, such as maintaining close thickness control in film-making, have called for engineering solutions. Shell, too, finds that the talent available and the information generated in its engineering research group makes it an invaluable consulting organization on a broad range of plant problems.

Key to making an engineering research group pay off: have it continually seek new knowledge by attacking the problems of the future, not spend its time on the perfection of existing knowledge.

How Isotopes Pay

Latest boost behind radioisotopes' bid for wider industrial utilization came in the form of an AEC price cut (CW Market Newsletter, June 13) that slashes costs of carbon-14 (from \$22-28 down to \$13/millicurie) and iridium-192 (from \$15 down to \$6./curie). Although the new prices will no doubt spur isotope utilization in existing applications, they once again pose the question: How real are the million-dollar savings attributed to industrial isotopes?

Some answers were found in case-history reports at recent meetings on isotope economics. They indicate that annual savings — currently estimated at \$250-500 million—are quite real, can be measured in terms of higher productivity, reduced scrap and other tangible process savings.

Growing Uses: At a Georgia Institute of Technology symposium, Seymour Henck, president of Henck Associates (Atlanta, Ga.), reported that the most common application of isotopes in industry is gauging, followed in order by radiography, research and process control. Leading user is the petroleum industry, followed by chemical and allied products, tobacco, rubber, paper and allied products, and about 13 other industries.

Companies using isotope gauging set-ups, said Henck, report a five- to 10-fold return on their investments — chiefly through raw material savings. Paper companies such as International, Kimberly-Clark and Marathon Southern estimate that investments of \$2,000-6,000/year are saving 10 to 20 times that amount in reduced raw material costs, scrap, labor costs and downtime. And even those who can't measure savings in such tangible terms report improved customer satisfaction resulting from improved quality of products.

Isotope gauges that measure and control density of liquid, powdered or solid products have chalked up even more spectacular savings in certain CPI plants. One firm substituted radioactive density gauges for hydrometers to measure saturated potassium and sodium chloride solutions, saved \$45,000 for an annual investment of \$1,000.

Radioactive tracers — widely used in biochemical and agricultural research — are also fostering industrial savings. A missile manufacturer, for example, used radioiodine-traced fuel to measure the effectiveness of solvents used for degreasing missile fuel lines. The tracer technique revealed that a \$2/gal. solvent was more efficient than the \$5/gal. material the company was using. Cost of the tracer project: \$30,000; savings on 200,000 gal./year of solvent: \$600,000.

Tracers may get an even greater play in food, agricultural chemical and pharmaceutical processing, suggested Henck, as a result of the recent tightening of pure food and drug statutes. Reason: tracer-tagged impurities can be detected easily and quickly at concentrations of less than 0.01 ppm. One food processor used tracers to determine the amount of solvent retained in a product, found the method cost \$100,000 less than the conventional analytical technique that would have been used.

New Uses: In addition to these established isotope uses, several extensions of present techniques into new industrial applications were forecast by Paul Aebersold, director of AEC's Office of Isotopes Development, at a recent meeting of the National Assn. of Manufacturers.

One important development now in the works is "double gauging"—the simultaneous control of two different



Milestones In Hydride Chemistry

On Stream!

New MHI Sodium Borohydride SWS*

lowest cost borohydride available

*SWS—Stabilized Water Solution!

A new low cost form of sodium borohydride is now available in large commercial quantities from Metal Hydrides Incorporated. In this new form, the contained sodium borohydride is priced at less than half that of the pure material. MHI Sodium Borohydride-SWS is a stable, aqueous caustic solution of sodium borohydride. The sodium borohydride content is about 12 weight per cent. This should be good news for chemical processes waiting for a lower cost borohydride product.

MHI Sodium Borohydride-SWS is an effective agent for the reduction of carbonyl groups to alcohols. With most aldehydes and all ketones tested, good yields of alcohols resulted. The reduction reaction of aldehydes takes place faster than

condensation or polymerization reactions which might be expected in the presence of strong caustic. This means that MHI Sodium Borohydride-SWS can be used to clean up small amounts of carbonyl and peroxides in organic products.

MHI Borohydride-SWS will also react with many inorganic ions, as does the pure borohydride, without interference from the caustic.

Other suggested uses for MHI Sodium Borohydride-SWS include foaming plastics and silicates; bleaching and stabilizing wood pulps; and treating natural and synthetic textiles.

Easy and safe to handle and use in standard equipment, new MHI Sodium Borohydride-SWS merits your attention. Write for complete information and order your trial quantities now!



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ENGINEERING

materials in contact, such as two metal sheets, a ceramic coating on metal or two liquid petrochemical products. Key to double gauging is the use of two different isotopes that register separate peaks on a high-resolution detection system.

Another device that should find extensive application in chemical processing plants is a corrosion mapping probe. By measuring the "back scatter" of gamma rays, this device will provide a continuous record of corrosion or erosion along the entire length of heat exchanger tubes.

A remote gauging technique now under development is expected to be very useful in areas where extreme temperature, pressures, chemical reactivity or health hazard preclude direct measurement. This is accomplished, said Aebersold, by incorporating an isotopic radiation source in a measuring instrument and picking up the changes in transmitted radiation by an external receiver.

Aebersold punctuated his report of present and future isotope uses with the conclusion that "isotopes have not been oversold—but, rather, underbought." And if prospective users will take a second look at isotopes from time to time, they'll likely find there's cold cash in hot atoms.

PROCESSES

Pyrites Patents: Three recent Spanish patents deal with these aspects of the processing of iron pyrites: (1) production of ammonium sulfate without going through sulfuric acid; (2) method of avoiding problems caused by arsenic content; (3) production of sulfur and iron, with the preliminary extraction of copper and zinc. The Ministry of Industry (Madrid) is erecting a small pilot plant for experimenting on the ammonium sulfate route and is negotiating with foreign companies for the possible use of the patents in other countries.

Coal Gasification: The Russian Underground Coal Gasification Administration says that gasification has been proved out in the laboratory and semiworks stages, will now be put into full commercial production. The Soviets say that the first section of the Angren Underground Coal Gasification Station is near completion, that it will be the largest in the world.

Rhodiability

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pioneering skill and technical
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of synthetic aromatics)*

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How one company went about securing a reliable source of Quality Drums*



1

The plant engineer advised the purchasing agent that new products being developed would require special containers. He suggested that Southern States be called in to see if these special containers could be produced in the big Birmingham drum plant.



2

Walter Rivers, Southern States' sales manager, went over the specifications with the purchasing agent and advised, "We can give you the drums you need, develop the linings you need and meet your delivery requirements." The proof of this statement came later.

* A composite story, relating an experience shared by many satisfied Southern States customers

Southern States Containers plant is fully equipped to meet every requirement in metal containers manufacturing. A full line of sizes and types of drums made from high-grade hot or cold-rolled or galvanized steel are built to take rough treatment almost indefinitely without seepage or leakage. All type of high bake phenolic linings, as well as clear, pigmented, or other types required for special uses, are applied. Standard production tests include soap-air side seam tests, water immersion pressure tests and periodic ICC drop impact tests. Regular film thickness readings are taken during painting and oven temperatures are charted

for each order to assure proper bake-out. Hydrostatic tests are made when required for extra quality insurance. Special decorations, colors and trademark designs are applied to customers' specifications.

Modern production line techniques, automatic equipment, scientific quality-testing assure you of prompt, accurate deliveries. When you specify the delivery date you want met, we meet it. If you would like to look further into the Southern States product and service story, we will welcome the opportunity to give you all the information you need.

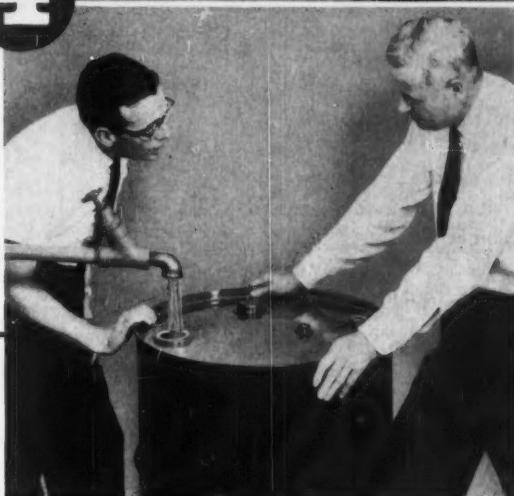


3

The tight delivery schedule was met, the drums were delivered right on time. In the modern Southern States plant orders large and small are turned out on time daily.

4

The plant engineer checked out the containers and the linings to see if they met the performance specs. set up. He reported the drums were absolutely satisfactory.



To move food, chemical or petroleum products in the South, call on Southern States. You can rely on us to meet your most exacting specifications with quality containers delivered on time. Complete details are available to you without obligation. Why not request them today while you're thinking about it?

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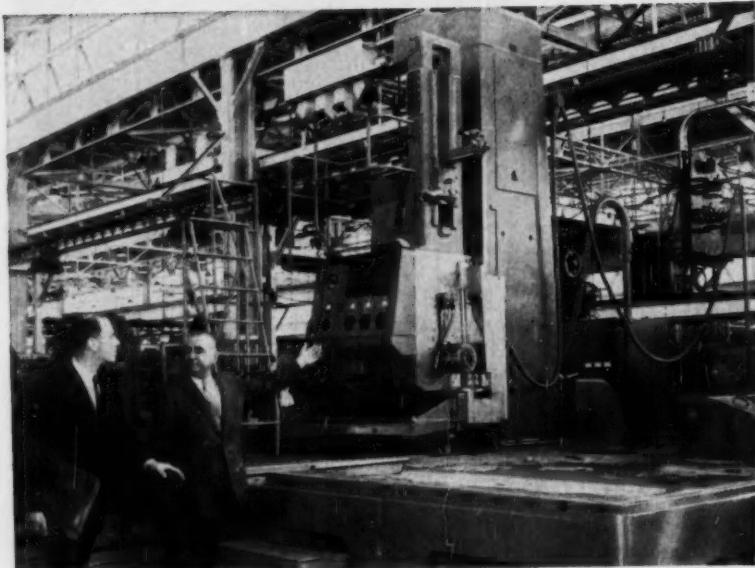
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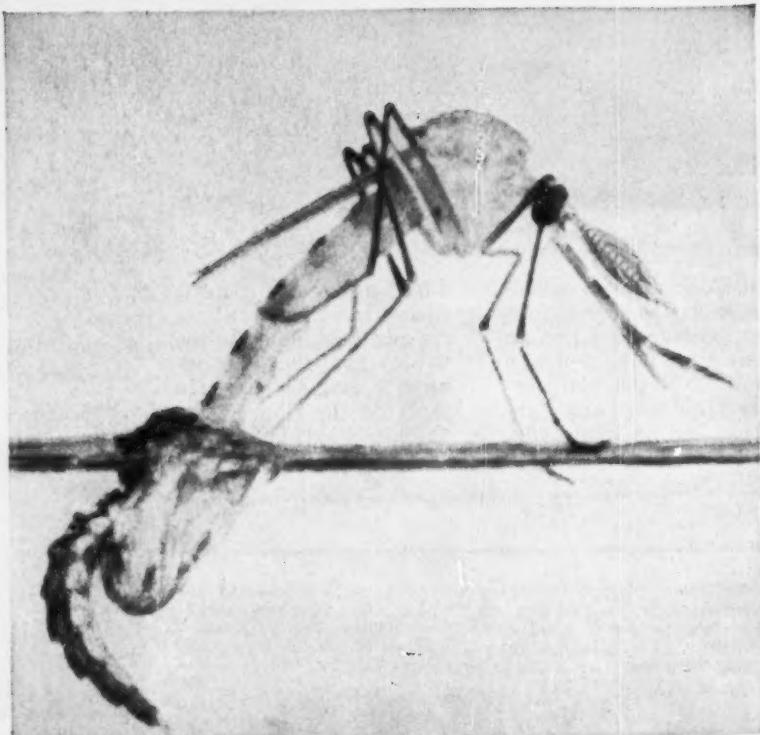


PROTECT HEAVY EQUIPMENT...

This giant Pratt & Whitney die cutter is typical of many applications for Parlon® based chlorinated rubber paints. Parlon finishes dry quickly, are economical to use, and provide a durable coating. Parlon based paint for this application supplied by The Egyptian Lacquer Co.

CONTROL INSECT PESTS...

This dramatic unretouched micro-photograph shows a mosquito emerging from the pupa stage. Today this pest and his many companions are no longer the threat to human health and comfort that they once were. Insecticides based on Hercules' materials such as toxaphene and Thanite® (Hercules isobornyl thiocyanacetate) are sudden death to such insects. In addition, meta-Delphene (Hercules diethyltoluamide) is the base for leading repellents which help to make outdoor summertime activities more enjoyable.



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RESEARCH

New Furnace

Thanks to research, "basic brick" is taking over a silica brick stronghold, the roof of the open-hearth steel furnace. Case in point: this week, Kaiser Aluminum & Chemical (Oakland, Calif.) has completed three roof tests of its new basic brick and has orders to install it in 15 furnaces.

General Refractories (Philadelphia) and Harbison-Walker Refractories (Pittsburgh) are spearheading the trend, have supplied the bulk of the new bricks.

Behind the trend is a current revolution in steelmaking that is upping furnace operating temperatures from 3000 F (the limit for silica brick) to 3200 F. The aim is to boost steel output; by forcing oxygen through a lance into the furnace, steelmakers are doubling the previous 20-30 tons-hour steelmaking rate.

This procedure, simply stepping up the furnace operating temperature, is becoming common practice as steel demand increases. Basic roofs not only withstand extra heat but also last as much as three times longer than silica. Average life of a silica roof is less than 150 heats vs. basic brick's 500 (a record established at U.S. Steel's Gary works).

Hot Research: The new bricks are the payoff of long research by refractory makers; and still more work is being done. All the new bricks are mixtures of chrome ore and magnesite, a clay "plasticizer" to expedite forming, and a chemical binding material (sulfuric acid, magnesium sulfate, or lignosulfonate) to help particles adhere to each other. Bricks are supplied in a steel casing that jackets four sides. (The top and bottom sides are open — one faces into the furnace.) This steel jacket forms a magnesioferrite bond between bricks when they are in place and heated.

There are differences, however, in the composition of bricks offered by various suppliers — such as the ratio of chrome ore to magnesite, uniformity of particle size, and purity of the magnesite. These differences can affect durability. All suppliers recognize the need for making further improvements to preserve or enhance

Bricks Build on Steel's Boom



'Basic brick' increases output of these open-hearth furnaces.



Harbison-Walker's Birch inspects furnace roof model in new lab.

their competitive position, of course.

At Pittsburgh, Harbison-Walker has set up a \$2-million laboratory for refractories research — an important part of which is on basic brick. H-W Metalkase 29-57 XXP is the firm's current offering for open-hearth roofs. It competes with General Refractories' 40-EE brick in open-hearth roofs.

While the two firms are competitors, they share one important asset: they jointly own (H-W has 60%) Northwest Magnesite Co., largest producer of dead-burned magnesite, major constituent in most basic brick. High-purity magnesite is critical in making long-lived basic brick. However, H-W — the nation's largest refractories producer — supplements its magnesite sources with a high-grade product obtained from its Ludington, Mich., plant, which was finished in '57. The major raw material is magnesium hydroxide supplied by Dow Chemical.

Harbison-Walker Research Director Raymond Birch is keeping an eye on a spate of other refractory problems as well as those concerned with basic brick. For oxygen steel-

making, a new process using a special furnace, his firm now offers an improved brick made from dead-magnesite and dolomite. This steel process is challenging the economics of the open hearth.

Aluminum metallurgy is another field in which refractories are making strides. H-W recently unveiled Coralite 3-59, a high-alumina (80%) brick that resists penetration and corrosion by molten aluminum. A new mortar has also been developed for use with this brick.

Birch considers that these and other achievements benefit customers as well as H-W. He points out, "For every dollar returned by research to the refractories producer, the consumer of the product often receives a manifold return. Almost without exception, refractories research is aimed at new products that will allow the customer's furnaces either to be kept in operation for longer periods or to be operated at higher temperatures. Either result benefits him immediately, whereas the return to the refractories maker may be delayed."

Durability Payoff: In the case of basic brick, there are savings despite

the new brick's higher cost — about five times as much as silica brick. One of the advantages: less downtime. In this era of high steel demand, furnace downtime is expensive in terms of lost steel production — sometimes as much as \$30,000/day/furnace. Considering the increase in steel output per furnace, even the \$40,000 (more or less, depending on the size and thickness of the roof) cost of installing basic brick is considered economic.

This trend means a tidy market in basic refractories, too. Of the 900 open-hearth furnaces in the U.S., 600 are expected to eventually have basic roofs. (The remainder are of obsolete design, can't support the heavier new brick.) About 165 basic roofs are now in place or on order.

It's almost certain that competition among suppliers of the new brick will increase, and so will research to make still better brick. Steel producers already have benefited, stand to make further gains from this research.

Drug Pacesetters

Three new drug products were unveiled this week: an antidepressant, a soluble "aspirin" that reduces gastric upset, and an enzyme that helps in the removal of cataracts.

- Warner-Lambert Research Institute (Morris Plains, N.J.) turned up the drug for use in simple depressions, those caused organically rather than by outside occurrences (e.g., loss of money). Called Nardil, the new drug is β -phenylethylhydrazine, generically phenelzine dihydrogen sulfate. It is said to be a rapid-acting, long-lasting monoamine oxidase inhibitor and is believed to restore depressed patients to normal by raising brain levels of certain amines.

- The new "aspirin," called Calurin, will be available only on prescription. It was developed by Smith-Dorsey Division of Wander Co. (Lincoln, Neb.) Chemically calcium acetylsalicylate-carbamide, it is reportedly more soluble than aspirin, producing higher salicylate blood levels than the latter.

Also, it is said to deposit no insoluble particles in the stomach, which Wander says is a frequent cause of irritation to patients (e.g., arthritics) on long-term, high-dosage aspirin therapy.

- Cataract victims can reportedly

Q. Why are Grape Growers like Rubber Researchers?



A• Exciting advances in both fields are directly related to chemical progress pioneered by Merck. Thanks to GIBREL®—Merck's new plant growth stimulant—grape growers are able to increase berry size and crop yield by as much as 50%. Farmers everywhere are vitally interested in more efficient crop production with GIBREL. Its "vitamin-like" action triggers normal growth in many plants by supplementing the growth-promoting substances naturally found in plants.

Another Merck chemical, MAGLITE® Y, meets the special processing requirements of the rubber industry's

most important new synthetic—a heat-resistant elastomer with promising applications in jet aircraft tires and other rubber products that must perform under extremely high temperatures. A reactive magnesium oxide, MAGLITE is also available in D, K and M grades that are particularly well suited for various product or processing needs of many different elastomers.

MAGLITE and GIBREL are representative of Merck research and production that speed progress in nearly every field served by chemistry. For technical information bulletins on either product write to Department CW-4

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RESEARCH

undergo safer, simpler surgery with the use of a new enzyme that assists cataract removal. The drug, α -chymotrypsin, is now being made under the name of Alpha Chymar by the Armour Pharmaceutical Co. (New York). It is a protein-digesting enzyme obtained from the pancreatic glands of cattle and it dissolves the ligaments that hold the lens to the eye.

More than 13,000 operations using the drug have been performed in the U.S. and abroad.

REPORTS

These reports are available from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

- "Physical Beneficiation of Low-Grade Uranium Ores," describes methods of purifying a variety of natural ores as well as some artificial mixtures. Investigations include: flotation, wet and dry attritioning, magnetic separation, electrostatic separation, other methods of minor use. Cost: \$2.75.

- "A Method of Determining the Epoxy Content of Cured and Uncured Resins" (PB 151150, 50¢) reports a chemical method of that analysis. The method used for determining the epoxy content of cured resins was modified by using a silver nitrate solution and a potentiometric method rather than sodium hydroxide and a colorimetric route. This, in turn, led to a good method of analysis of uncured resins.

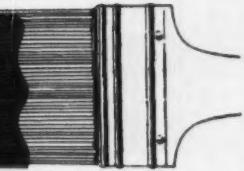
- "Synthesis of High-Impact Strength Adhesives from Epoxy Resins" (PB 151128, 50¢) shows that reactive epoxy resins with promising adhesive properties can be synthesized from dihydroxydiphenyl sulfone and epichlorohydrin.

PRODUCTS

Sphere Samples: Two samples of glass spheres useful in measuring the opening in standard sieves are available from the National Bureau of Standards, Washington 25, D.C. Standard sample 1017 having diameters from 50-230 microns can be used to test sieves No. 270 through No. 70; sample 1018 has spheres with diameters from 210 to 980 microns, can be used to calibrate sieves No. 70 through No. 20.

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Contact your resin or paint supplier. Ask about his alkyd and polyester formulations employing Oronite Isophthalic. Oronite has made available to resin and paint producers a series of suggested Isophthalic alkyd and polyester formulations, together with resin samples, cooking techniques and testing methods. Superior coatings, based on Oronite Isophthalic, are now being offered in every protective coating classification.

Write Oronite, the only experienced Isophthalic source, on how its new basic material can up-grade the coatings you use or market.



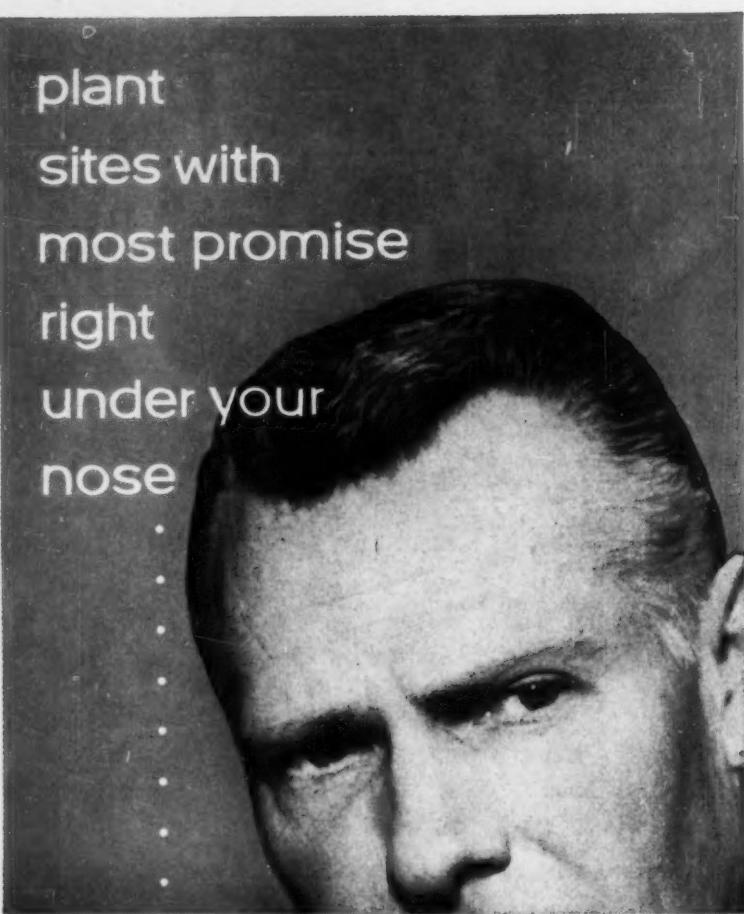
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RESEARCH

EXPANSION

- Hagan Chemical and Controls, Inc. (Pittsburgh), will build a \$250,000 addition to its existing research facilities in suburban Pittsburgh. Included will be a chemical pilot lab and a mechanical research and development lab for pneumatic-control systems and components.

- Frontier Chemical Co., division of Vulcan Materials Co. (Wichita) will construct a research and development lab and pilot plant in Wichita.

- Picker X-Ray Corp. (Cleveland) will open its new research center in that city this week. Plans are to include a large radioisotope encapsulation facility, a radiography lab, and research and development equipment in the field of nuclear instrumentation and X-ray diffraction.

- **Armcur Research Foundation** of the Illinois Institute of Technology (Chicago) broke ground last week for its new, \$3.5-million chemical research building, to be used to consolidate ARF's chemistry and chemical engineering staff under one roof. It will be completed in 18 months.

- Parke, Davis & Co. (Detroit) reports that completion date for its \$13-million research center at Ann Arbor, Mich., will be early '60.

- The Food & Drug Administration recently dedicated its Detroit headquarters, including a bacteriological unit, two chemical labs, a natural light lab for color work in food additives and pesticides. Cost: \$1 million.

- Engelhard Industries Inc. (Newark, N.J.), refiner and fabricator of platinum metals, gold and silver, officially opened its new research and development laboratory in that city last week.

- Chemstrand Corp. (Decatur, Ala.) will move its research center from Decatur to Raleigh, N.C., next year. Purpose: "To get closer to the heart of the textile industry." Research operations at Raleigh are to begin in late '60.

- Monsanto Chemical Co. will move its Nicolas Rd., St. Louis, research facilities to the firm's St. Louis headquarters area. Conditional approval for the move has been given by the Monsanto board of directors, pending solution of zoning problems for the prospective facilities. The move is at least two years away, say Monsanto spokesmen.

MgO spells opportunity

IMC reports on another outstanding property of its new High Purity MgO—remarkable heat resistance.

For many years, International's potash mining and refining operation at Carlsbad, New Mexico, has been producing large amounts of by-product magnesium chloride brine in conjunction with potassium sulfate. We are recovering values from this magnesium chloride by thermal decomposition to produce magnesium oxide. The product is better than 99% pure — highest purity ever achieved in carload lots.

Unbounded application

Heat resistance is one standout property. As a result, a firm is presently experimenting with it to develop a rocket nose cone capable of re-entering the earth's atmosphere. Another of its chief virtues is ease of handling, due to its low hydration rate.

Using MgO as an addition or substitution, many chemical process industries have been able to impart desirable — and hitherto unattainable — properties to their products. To elaborate:

- Improving the physical and chemical characteristics of magnesia has resulted in substantial savings. Using MgO as an extender, it's possible to obtain a high purity blend at low cost.
- Chemical manufacturers are making high-purity magnesium salts and chemicals from International magnesium oxide because of its relatively low cost and easily controlled reaction rates.
- By replacing ordinary alkali pre-



cipitants with MgO, several plants have been able to increase their process efficiency and reduce production costs.

Among its other applications: Electric furnace fusion for high temperature applications . . . in high-grade ceramic and glass formulations . . . for acid neutralization and uranium ore treatment . . . in thermocouples . . . as a substitute for alumina. Due to its low boron content, this International product has been the main source of MgO for U.S. Atomic Energy Commission applications. And

the limits of its potential are nowhere in sight.

Send for a sample

If you're interested in the possibilities of high-purity MgO in your operations . . . if you detect promise for its use as a replacement material or in an entirely new application — use the coupon below. Our research staff is prepared to explore end-use problems with you. We will be happy to furnish adequate samples for experiment, and to supply technical assistance where required.

22-59

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RESEARCH

LITERATURE

• The Research Chemical Division of Nuclear Corp. of America (Burbank, Calif.) has revised its price list of rare-earth oxides and salts used for research. Prices for a number of purified rare earths have been reduced.

• Butterworths Scientific Publications (London) will publish *Polymer*, a new quarterly journal, containing original papers in chemistry, physics and application of polymer research and on other disciplines that contribute to the development of polymer science. It will cost £5/issue; publication will begin about Oct. '59.

• Pergamon Press (New York) will make available this summer a monthly publication, *U.S.S.R. Patents and Inventions*, which is a cover-to-cover English translation of the Soviet publication *Bulleten Izobretений* (comparable to *U.S. Patent Gazette*). Cost: \$80/year. The "Chemistry and Chemical Engineering Section" is available at \$40/year. Copies of Russian patents are available from the firm at \$1 each in Russian, \$5 each in English translation.

APPARATUS

Bench-Scale Autoclave: Pressure Products Industries, Inc. (Hatboro, Pa.), has a new, 300-ml., 5,000-psig. reactor useful in bench-scale, high-pressure reactions. Features: it requires only 20x12 in. space, has a built-in stirrer, which is available in four types (marine propeller, turbine, paddle, or gas dispersing).

Zone Refiner: Latest product from Fisher Scientific Co. (Pittsburgh) is a zone refiner said to purify any material that melts between 50 C and 300 C. The refiner can be set for one pass or for continuous passes until the desired purity of product is reached. Cost: \$545.

Custom Vacuum Systems: Thomson Chemicals, Inc. (Woburn, Mass.), has custom vacuum systems available within the range 10⁻⁶ to 10⁻¹⁰ mm. of mercury.

Fraction Collector: A "machinegun belt" fraction collector is available from Chicago Apparatus Co. (Chicago). It's useful in chromatographic

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FOR PARTICLE
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SPECIFY AUTO-SET 31* BY *Borden!***

Borden's new self-setting particle board binder—Auto-Set 31*—gives you highest production efficiency at lowest cost. There's no separate catalyst to add, no mixing equipment, no mixing errors to hamper production and no chance for jelling or setting up resin in mixer or spray system.

Laboratory and field tests indicate that Auto-Set 31* can offer you at least several of the following advantages: Minimize surface pre-cure—improve internal bond—cut resin requirements up to 20%—

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Auto-Set 31* is backed by the experience and know-how of Borden wood technologists, chemists and engineers. And Borden's adhesive laboratories are at your service to help solve particle board production problems.

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RESEARCH

work to collect a large number of liquid samples. Feature: high accuracy in measuring samples.

Moisture Balance: Latest entry of Central Scientific Co. (Chicago) is an improved moisture balance for fast and accurate moisture content determinations in a wide variety of materials. A built-in autotransformer automatically regulates voltage, provides a convenient constant temperature control.

Stereomicroscopes: Wild Heerbrugg Instruments, Inc. (Port Washington, N.Y.) is distributor of the M-5, a Swiss stereomicroscope with magnifications of 6X, 12X, 25X and 50X. Edmund Scientific Co. (Barrington, N.J.) offers a stereomicroscope at \$107, with magnifications of 6X, 10X, 23X and 40X. Suggested uses: examining oil well cores, textile samples.

Metabolic Tracer Unit: The overall metabolic fate of tracer-labeled compounds fed to small animals can be studied with a new glass apparatus called a Metabolic Tracer Unit. It's available from Volk Radio-Chemical Co. (Chicago).

Iron Analyzer: Applied Research Laboratories Inc. (Glendale, Calif.) claims that its Quantovac vacuum spectrometer can make a complete analysis of any iron alloy in less than two minutes. The results are permanently inked, show the concentration of all elements present. Time saved over prior systems, according to the firm, is 60%.

Fluorine Detector: Stanford Research Institute (Menlo Park, Calif.) says it has developed a fluorine detector that will measure a quantity of fluorine in air as low as one or two parts in 10 billion in a few minutes. The recorder works on the principle of a differential photometer. Suggested uses: industrial stack analyses, to check on fluoride concentrations in plant areas.

Food Flavors: A series of protein hydrolysates having pork and beef flavors are available from American Biosynthetics Corp.'s Milwaukee Research Institute Division (Milwaukee, Wis.). They are said to have emulsifier and antioxidant properties.

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process
any of
these
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printing inks
leather goods
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compounds
petroleum
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improves quality... gives your
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New Foote Lithium Metal Dispersion . . . so reactive that it bursts into flame on contact with cold water. Light for the photo was supplied by the reaction.

NEW HIGH-REACTIVITY LITHIUM DISPERSIONS

Foote's new form of Lithium Dispersions realizes the high catalytic assets of lithium metal, lithium hydride, and lithium butyl . . . permitting faster, more complete, more controlled reactions.

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bulk lithium dispersed in hydrocarbons.

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Available in various solvents, such as hexane and pentane.

No oxygen, please! Foote's new process prevents the formation of activity-reducing coatings. X-ray

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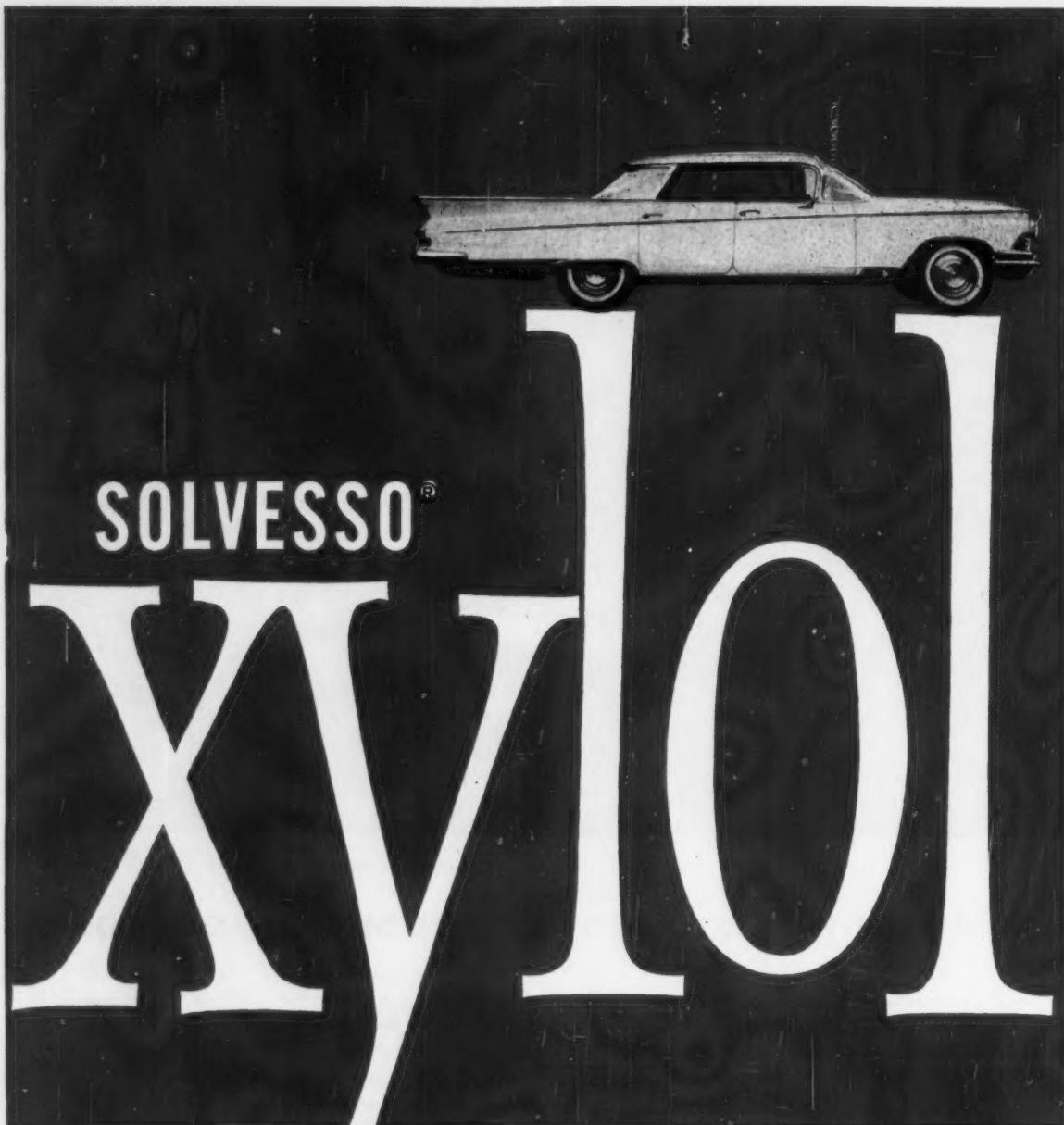
Small, uniform particle size makes the lithium metal and lithium hydride much more reactive than the usual forms. The small particle size facilitates reaction with the *whole* particle even if insoluble reaction products are formed. The uniform size means that *all* the metal will be used.

A more complete technical description of these new lithium dispersions is just off press. This literature and samples are available upon letterhead request to Technical Literature Department, Foote Mineral Company, 420 Eighteen West Chelten Building, Philadelphia 44, Pennsylvania.



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Market Newsletter

CHEMICAL WEEK
June 20, 1959

The second big price cut within two months sends lysine mono-hydrochloride tabs tumbling another 17½ %, to \$4.95/lb. for 100-lb. and 25-lb. drums. The first reduction knocked the price down 25%, from \$8 to \$6/lb. (*CW Market Newsletter, April 11*).

The new cut doesn't come as a surprise; after the first revision, General Mills hinted it would probably soon take the initiative on a second round of reductions (Merck led the way with the first one). As things turned out, however, the fast competitive shuffle wound up with Merck again posting its revision a day ahead of General Mills.

A price hike on formaldehyde—which Reichhold Chemicals earlier this year hinted was on the way (*CW Market Newsletter, March 14*)—will take effect June 15 on spot sales and July 1 on contract orders.

The current $\frac{1}{4}$ ¢/lb. increase on 37% formaldehyde raises the base price to 3.75¢/lb. with "usual differentials applying to other grades." Reichhold gave no official explanation for the change; but warning of the impending hike, by Reichhold's Vice-President Ralph Urich, came when methanol tabs were raised three months ago (*CW Market Newsletter, March 7*).

Other producers were vocally "happy" about Reichhold's move, promptly posted similar increases of their own.

Reflecting the formaldehyde increase is a paraformaldehyde price boost. On June 15 on spot orders, July 1 on contract, flake material will be 10¢/lb. in 50-lb. bags, 11.5¢/lb. in 100-lb. drums, 10.5¢/lb. in 300-lb. drums (original prices were 9.55¢, 11.05¢, 10.05¢, respectively).

Powdered paraformaldehyde prices will go to 16.7¢/lb. in 50-lb. bags, 17.7¢/lb. in 100-lb. drums, 17.2¢/lb. in 300-lb. drums.

There is, however, little evidence of reflected price hikes on other formaldehyde products. One major producer of urea-formaldehyde resins, for example, says that supplies are adequate and no price increases on these materials are likely in the near future.

Reichhold also officially upped phthalic anhydride prices by 2¢/lb. this week, for reasons President Henry Reichhold spelled out to *CW* last week (see p. 35). That brings RCI'S phthalic tabs to 19¢/lb. effective June 15 on spot and July 1 on contract orders.

Reactions of other phthalic producers: disagreement with Reichhold's views; obvious reluctance by many to follow suit. Some observers unofficially minimized the alleged near-shortage situation, said it's unlikely that Reichhold can make the hike stick.

Market Newsletter

(Continued)

A big 40% price cut on solid-grade polyvinylpyrrolidone brings cost of the General Aniline & Film product (known as PVP K-90) down to \$1.80/lb. in carload and truckload drum quantities. A GAF spokesman says competitive pressure was not a factor in the cut, which was made to bring the product into a "commercial price level." GAF claims it is the only U.S. maker of PVP; some material is imported from Germany.

A new, 15-million-lbs./year liquid epoxy resins plant has been put onstream at Marietta, O., by Union Carbide Plastics. The unit will produce a wide variety of epoxy materials—many that are just now being offered for sale—for a host of uses, including protective coatings, plastics, adhesives.

Carbide Plastics' President R. K. Turner voiced his company's optimism about future epoxy markets despite some industry fretting about chronic oversupplies (*CW, Dec. 13, '58, p. 73*). Turner points to the pleasure-boat building market as a growing one because of development of new spray-gun techniques (*CW, Feb. 14, p. 75*). He says this and other expanding uses will double the total epoxies market "in the next few years."

Increasing demand for vinyl foam cushioning is also looked for by Carbide. Demand has increased Carbide's cushion-producing facilities by 100%. UCP'S Vinylfoam Division manufacturing operations will be transferred to bigger quarters in Newark, N.J., by June 22; a new 500-lbs./hour-capacity production line there will later be boosted by reinstallation of a 300-lb./hour unit that is currently being used at the old plant.

Plastics use in building construction could be enhanced considerably by a year-long fire-safety study—to cost \$19,000—at Southwest Research Institute (San Antonio, Tex.). It's sponsored by the Manufacturing Chemists' Assn. The group's findings could do much to free plastics from sales-hampering rules of outmoded building codes (*CW, Aug. 17, '57, p. 95*).

SELECTED PRICE CHANGES—WEEK ENDING JUNE 15, 1959

	Change	New Price
UP		
Corn oil, crude, tanks	\$0.0025	\$0.13
Tin metal (Staats)	0.21	1.05
DOWN		
1-Lysine monohydrochloride, 25 dms. or more	\$1.05	\$4.95
Mercury metal, 76 lbs. per flask	1.00	242.00
Cocoa butter, bgs.	0.015	0.705

All prices per pound unless quantity is quoted.

NOW IN PRODUCTION: stronger, safer, heavy duty polyethylene bags for packaging hygroscopic chemicals!

These new heavy duty, 100% polyethylene bags offer special advantages for chemical packaging: (1) the polyethylene is chemically inert, unaffected by most chemicals; (2) the bags are waterproof, and their exclusive Chipp-a-Weld seal is virtually as strong as the polyethylene itself; (3) Shipping experience has proved the bags reduce breakage to less than $\frac{1}{4}$ of 1% (and punctures or breaks that did occur did not spread). The bags can be made in any size to fit your bulk packaging requirements, and printed in 4 colors. This new bag was developed and perfected by Chippewa Plastics—leader in polyethylene research, technical know-how, and the development of specialized equipment for quality-controlled mass production. Certain chemicals have

already been approved for interstate shipment. Test permits have been issued for many others. Chippewa engineers can help improve your packaging operations because of their specialized knowledge gained in developing heavy duty polyethylene bags and closure techniques. For further information, contact:

Department of Chemical Packaging
CHIPPEWA PLASTICS CO.
Division of Rexall Drug and Chemical Company
Chippewa Falls, Wisconsin



The mark of leadership

researched by Chippewa





CHEMICAL BUYERS GET A BONUS

The sale of a drum—or a tank car—of processing chemicals can mean many things. At Dow, what's outside the drum or tank car is considered of equal importance with what's inside. Buyers of Dow chemicals always get dependable, uniform product inside . . . and a bonus outside in the form of assurance of adequate future supply, as well as prompt, economical delivery and specialized Dow technical service.

You may wish to check certain items in this advertisement and forward to those concerned in your company.

ROUTE TO:

NEW CENSUS REVEALS BURGEONING POLYOL POPULATION

"The men that make the most of them" report plenty of polyols, abundant supplies in the foreseeable future, experienced polyol specialists ready to help Dow customers select and adapt products for their needs . . .

"If we can't help a customer find the right polyol from our line-up", comments a Dow research chemist, "it's probably because a polyol is not the answer to his request!" Polyol specialists at Dow recently paused in their full-time job of matching polyols to

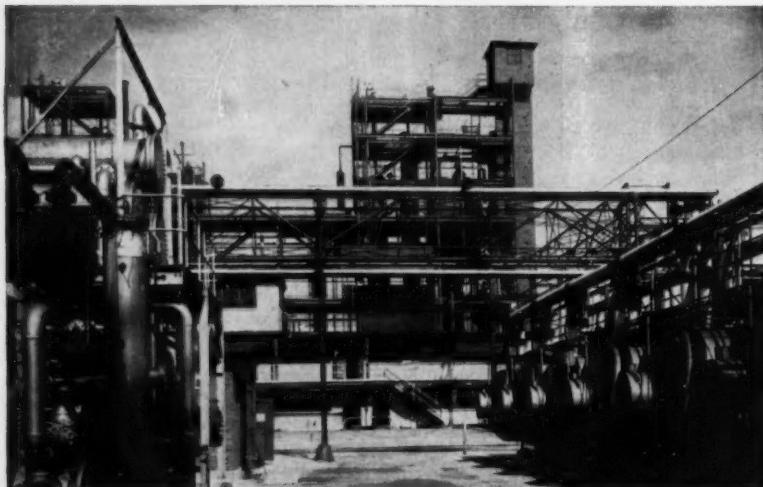
specific problems long enough to count polyol noses. When all the returns were in, the grand total showed Dow now offers hundreds of different polyol products!

This figure certainly supports Dow's claim to "the world's widest line". There is, of course, another facet to Dow's position in the polyol business that is just as important, though less easily measured.

It is that Dow is BASIC in polyols. Dow is its own supplier for all of the ingredients that go into its polyols, and all the ingredients that go into the ingredients. Thus, the production of Dow

polyols is closely controlled, right from ethylene and propylene. The end result is invariably highest quality, purity and uniformity.

This complete control of all raw materials is also significant because all factors of availability and basic supply are in Dow's hands. This means Dow customers can look forward to stable, low prices in the years to come. Last, but far from least, is the reservoir of experience and technical know-how Dow has built up over a wide area of polyol chemistry. This deep background is readily available, in the form of extensive production and re-



Dow polyol plants strategically located at Midland, Mich., Freeport, Texas and Plaquemine, La.

Attractive



DOWTHERM® A

This organic liquid serves as a heat-transfer medium with fraction-of-a-degree temperature control in the 350°-750°F. range. Less fire hazard, far less pressure than with steam systems!

search facilities, as well as a crack team of polyol specialists.

Glycerine is an excellent example of the way in which Dow's basic position has exerted a stabilizing influence on polyol price and availability. Since 1953 the price of glycerine has stayed below 30¢ a pound. The big Freeport plant assures chemical buyers of a dependable supply of glycerine, in any quantity, at all times.

Another major branch of the family, the propylene polyols, also benefits from abundant Dow production capacity. Dow plants located at Plaquemine, La., Freeport, Texas and Midland, Michigan, produce oxides, starting point for quality glycol products. These chemicals have no peers for purity. In fact, Dow produces a propylene glycol that qualifies for USP grade!

Ethylene polyols are further proof of the same pudding. Dow is a leading producer of caustic and chlorine, two of the ingredients Dow uses to make ethylene oxide by the chlorohydrin process. The other ingredient is also "captive"—Dow maintains a cracking plant for the express purpose of producing ethylene. Dow quality control watchdogs scrutinize the production of EO derivatives, the ethylene glycols and the polyethylene glycols. Six modern Dow bulk terminals put every plant in the U. S. on the main polyol supply line.



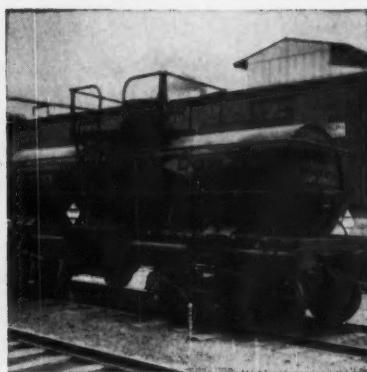
CHEMICAL PROCESSING NEWS is constantly in the making at Dow. If you'd like more information on any of the products discussed in this advertisement or any other Dow chemicals, contact the Dow sales office near you or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 915AM-20.



IMPROVED SPECS for versatile solvents

There's plenty of news about Dowanol® glycol ether solvents, and it's all good! Dow's continuing product research has enabled it to tighten the reins on production of Dowanol and upgraded specifications a full notch. This means higher quality and greater purity in every Dowanol solvent . . . and in products which utilize them.

Miscibility in water and a wide range of organic materials is the outstanding characteristic of Dowanol solvents. Already proved in such applications as brake fluids, lacquers, cosmetics, paints and varnishes, these versatile chemicals invite consideration when new products are in the development stage.



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Bromine was the first Dow product, and today Dow is its foremost producer. Dow continues as a leading supplier and provides a host of brominated products. Six decades of bromine experience have built a backlog of information on the subject. Dow offers technical and developmental services on bromine and its derivatives second to none.

Because of this dominant position in the field, Dow can frequently tailor or upgrade bromine less expensively than customers can do it themselves. These savings, of course, benefit Dow customers. A good motto for chemical buyers to adopt is "If it involves bromine—consult Dow first."

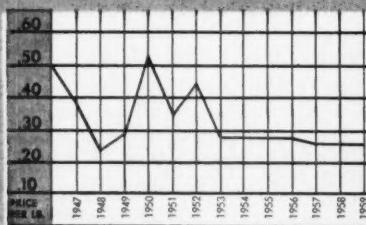
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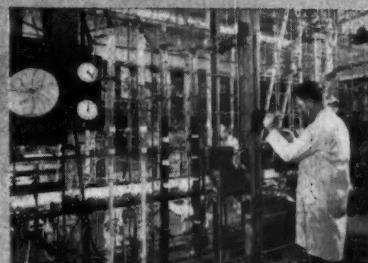
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Price Statistics: Glycerine Statistics, L. Pasternak Company, 1947-1951; Journal of Commerce, 1952-1959.

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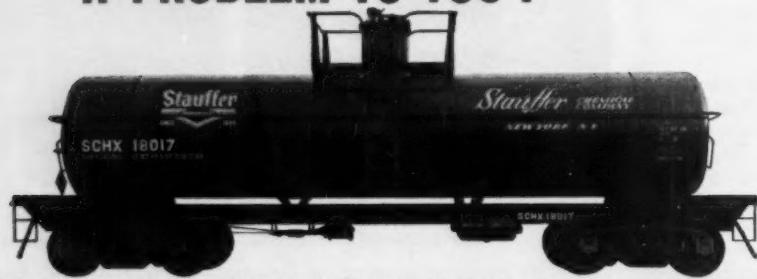
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ADMINISTRATION



CW PHOTO—ED WALLOWITCH

Borden Chemical's Marusi advises government-contract research as a means of company growth.

He's Seeking More Government Business

In the red-tape-ridden atmosphere surrounding work for the government, companies can easily lose sight of the administrative and technological benefits—as well as profits—that can accrue from such activity. An awareness of this has led Borden's Chemical Co. to put special emphasis on its government contract group, which is settling down at new headquarters in Middlesex, N.J. Company President Augustine "Gus" Marusi last week explained the company's approach.

Marusi explained that contracts Borden's services group developed and promoted "not only make a contribution to the government's preparedness and disease-prevention efforts but also provide the company with valuable technology and employee training."

Specific Projects: Although current projects are classified, Marusi told *CW* that in the past his chemical company has been successful in providing the government with a nerve-gas antidote, a fluorescent labeling agent for the study of antigen antibody reaction and a new adhesive for applying exterior insulation to such objects as ships. The company, a division of The Borden Co., also developed types of instant coffee and powdered milk for the government.

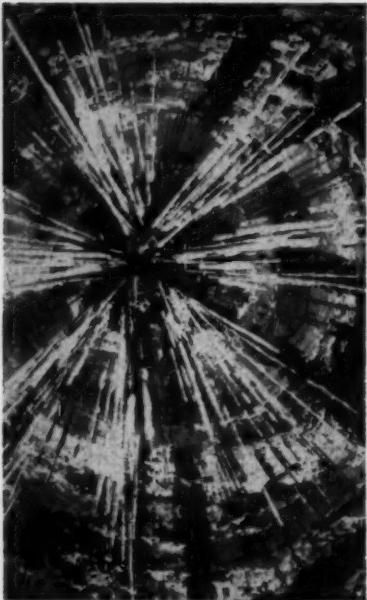
Fit the Project: Administratively, Borden has learned that the best policy is to fit the project to the facilities and personnel at hand. "Thus, in the past," Marusi said, "it has not been necessary to employ special skills to carry on a particular project." He adds, however, "this doesn't mean

that we would not hire specialists."

"Our idea has been to let the government know that we have certain skills and techniques available," Marusi stressed. Most of the chemical operation's government-contract research is done at the firm's Dajac Laboratories in Philadelphia.

Information Switchboard: Borden's Government Services Dept. is the hub of the firm's contacts with government agencies. In business four years, the department a few weeks ago moved from the company's New York offices to the coatings and adhesives manufacturing plant in Middlesex, N.J. Aim was to coordinate that section's burgeoning government contract business. While Borden's Food Products Co. also does some government contract work, the chem-

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ADMINISTRATION

ical company is the only operation within the corporate structure with its own setup of this kind.

The department came about, according to Marusi, as the result of government pressures to provide a centralized authority through which contracts could be negotiated. "At first, the government contacted us and asked if we'd be interested in taking on specific projects," Marusi recalled. "I went to Washington and found that everyone felt that a special department was needed . . . as a clearing house. Before this, we had let each operation handle its own government-contract business."

Other CPI firms have similar, but often smaller, groups. In many instances, firms have what they term "contact men." One large engineering firm, for example, recently appointed a "government liaison man" whose sole job is to represent the company in Washington. A more ambitious service was that of General Electric, which, a few months ago, made up a series of charts showing titles and names of people in the Defense Dept. as a guide to help its executives in dealing with that agency.

More Coming: Indications are that many more chemical firms will be able to benefit from government contract work. From 5 to 10% of all military research and development money has already been earmarked for what could be considered "basic research." Estimated research costs for '60, starting July 1, will range from \$130 million to \$260 million, compared with expenditures this fiscal year of from \$115 million to \$230 million.

Latest Defense Dept. figures — for fiscal '58 — show that 406 industrial companies and 91 universities and nonprofit research institutions held military prime contracts for all types of experimental and research work.

Government contract projects have their disadvantages — security clearances, bureaucratic red tape, and the like — but, Marusi points out, "while there are some security restrictions, they're not unreasonable," despite the general impression.

"You have to realize that there's no short-term profit in any of this. The gain comes from the interchange of ideas with government scientists and scientists from other concerns — all working on the same projects," he says.

Rotarians Speak Up

Small U.S. chemical producers and several from foreign countries last week voiced their current troubles in a vocational craft discussion group organized for them by Rotary International at its convention in New York City. Main problem for most of them: dealing with labor and the union movement.

The assembly was one of a number devoted to the role of the Rotarian in business, was based on the problem of how to be of service in one's chosen field. While the 18 management men on hand showed interest in all subjects discussed, they obviously warmed to the discussion of employment problems. Most felt they were giving their employees something better than a "square deal," agreed that workers still didn't seem satisfied.

Sponge Throw-in: The president of a small chemical firm located 20 miles north of Boston, Mass., told the group that he had just won his third election to block the union from his plant. But he added that after each fight his business was in such a turmoil it took considerable time to restore order, felt that next year he would "throw in the sponge," invite the union to come in. He announced that he has decided to build a new plant in North Carolina, largely because of the labor problem in Massachusetts. Others present said that the firm would do better to struggle against unionization than give in to it.

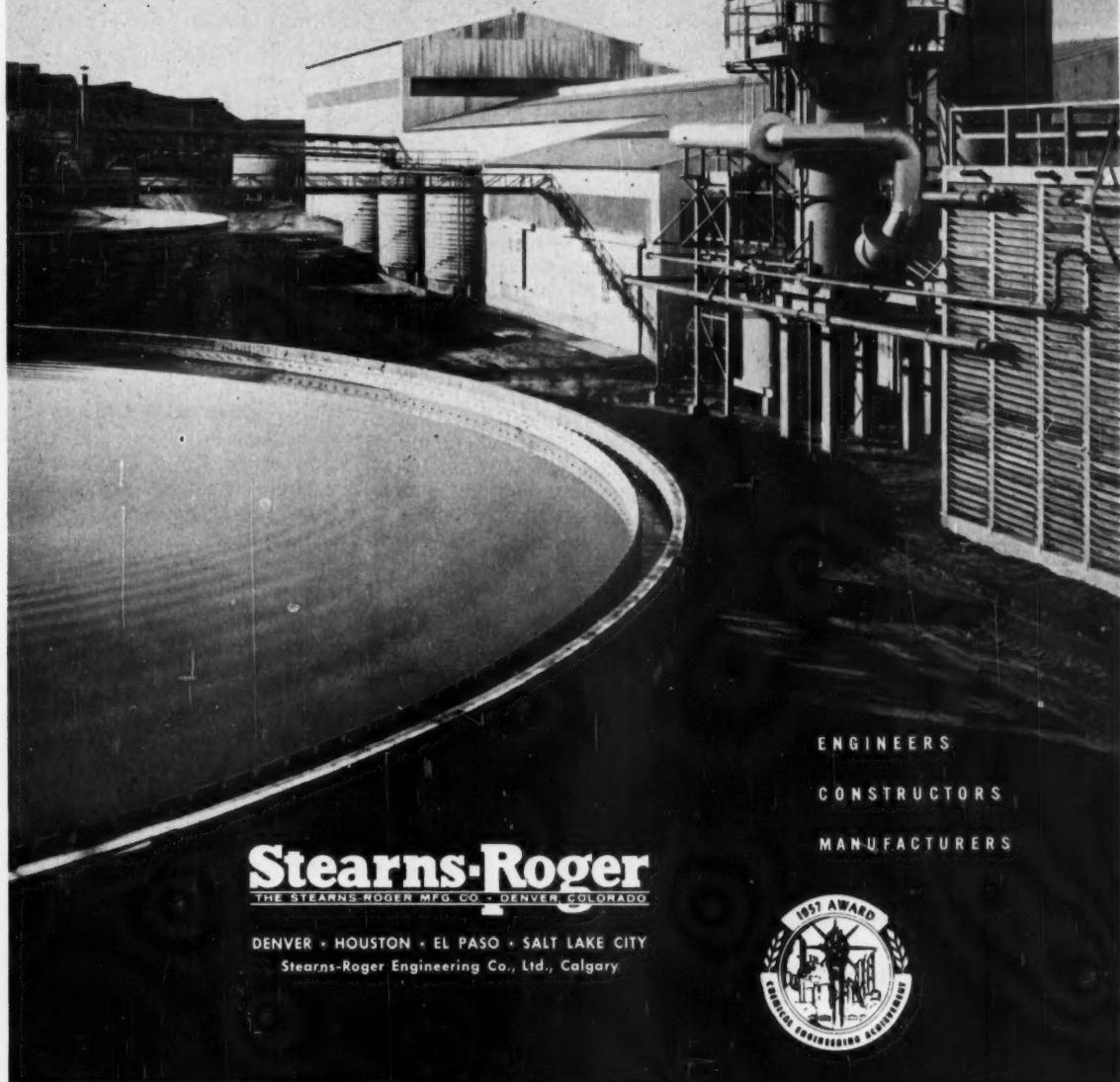
There was criticism also within the group that wages paid workers in the larger CPI firms put pressure on smaller companies to keep pace. There was general agreement, however, that wages were not the primary factor in worker dissatisfaction. Other factors, such as seniority, were equally important, the delegates said.

On the broad subject of workers and unions, the delegates agreed that their duty as Rotarians was to stand by what they believed to be right in the conduct of their businesses, regardless of union pressures.

In another discussion group attended largely by retail druggists and pharmacists from as far away as France and Australia, delegates leveled charges that they are getting a bad name from the false and misleading advertising by producers of over-the-counter drugs and medicines.

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ADMINISTRATION



Workers wait out bitter Virginia-Carolina plant strike.

Raising Phosphate Furor

Amid bitter exchanges and some violence, phosphate miners, operators and producers in Florida were settling down last week to wait out a strike at Virginia-Carolina Chemical Corp.'s Nichols plant. It's the first serious labor trouble between the International Chemical Workers Union and any of the phosphate producers in the area (see table, p. 128).

Although Virginia-Carolina's President Justin Potter has declared that V-C would settle for a 10½¢/hour wage package, said to be "as high as any other company" [and] "at a time when we could not afford to raise our costs," CW reports from the area indicate that wages are not the crux of the problem. At stake are company proposals to switch union dues check-off authorization from a yearly to a monthly basis, and to withdraw from the contract a union recognition clause which is reportedly at odds with Florida's right-to-work law.

Still another controversial matter is a proposal by the company to put under two contracts work that has until now been included in one. These jobs involve rock mining and the manufacture of triple superphosphate.

The union's argument is based on alleged health problems connected with "triple" manufacture. It contends that under a single contract a man whose health was impaired making the fertilizer could use his seniority to

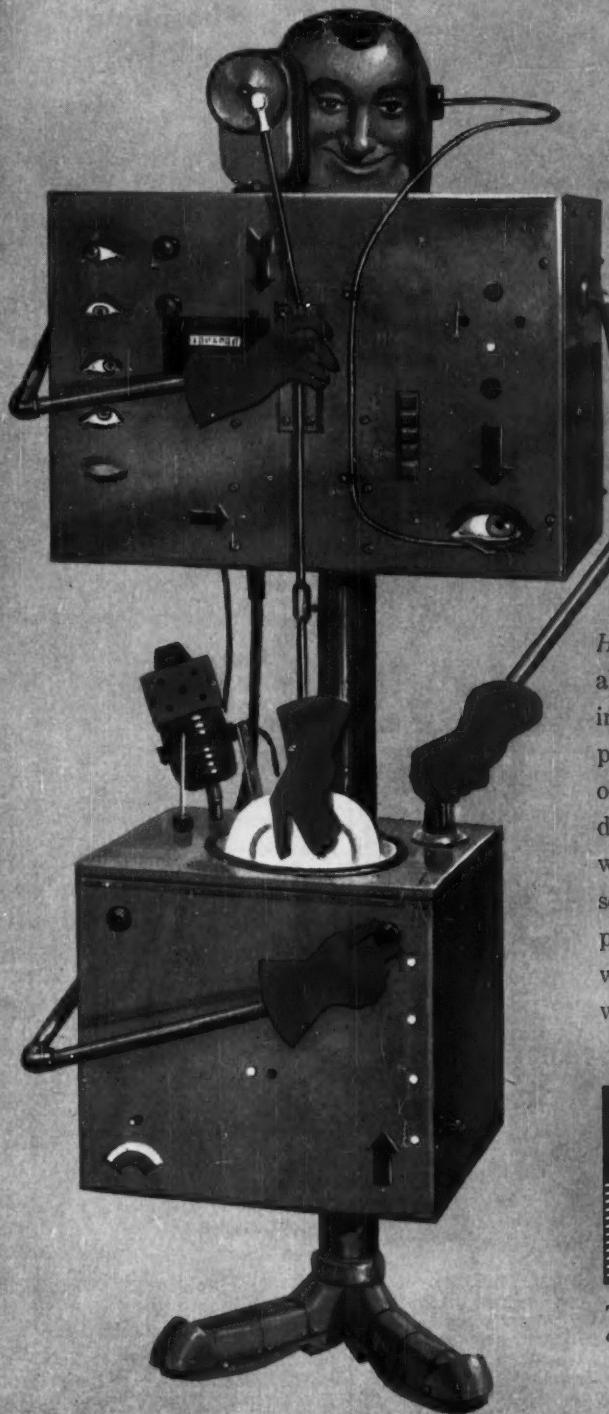
return to mining, but under the proposed two-contract plan, he might even lose the latter opportunity.

One further irritant, feels the union, is the company's approach to the handling of overtime and job assignments. In this, the company seeks the right to assign workers of a certain job classification to other jobs that cannot be completed before closing time without additional help.

Long Siege: The strike may be a lengthy one. Signs of this are indicated in a pledge by seven of the 12 locals to put up \$6,000 a week to aid the strikers, and by the withdrawal from the scene of federal mediator Joe Pierce, until prospects appear brighter for settlement. Also grimly coloring the picture is V-C's posting of hired armed guards around the plant.

How the strike will affect upcoming bargaining at other locations is difficult to assess. Certainly, union resources of both money and organizers are under a strain and if the strike should continue into July, its toll will be felt in negotiations between ICWU and the four plants due for bargaining at that time. Until now, settlements have been relatively amicable —e.g., ICWU and American Agricultural Chemical signed a two-year contract; IMCC entered into a three-year agreement. Both of these pacts have come within the past month.

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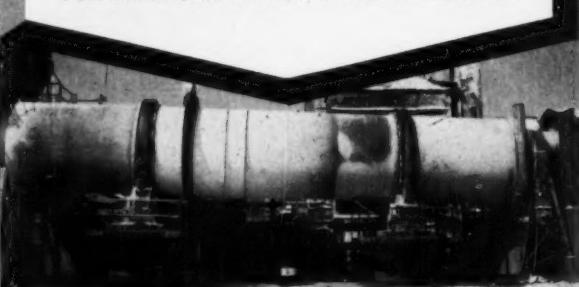
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ADMINISTRATION

Phosphate Labor Contracts

Company	Expiration Date
Swift & Co. (Winter Haven, Fla.)	Jan. 15, '59
Swift & Co. (Barlow)	May '59*
American Agricultural Chemical	May 15, '59
International Minerals (Rock Dept.)	May 15, '59
Virginia-Carolina	May 15, '59
International Minerals (Fertilizer)	July '59*
F. S. Reyster Guano Co.	July 1, '59
Coronet Phosphate Co.	July 15, '59
International Minerals	July 15, '59
Armour & Co.	Aug. 1, '59
American Cyanamid Co.	Sept. 15, '59
U. S. Phosphoric Products (Tennessee Corp.)	Sept. 15, '59

*Wage reopeners.

health argument by ICWU over the V-C proposal to separate mining and manufacturing operations, the vaunted threats of last March to make the problem of air pollution and alleged fluorosis a major feature in current bargaining have not materialized. The confusion surrounding these issues has in the past led to wide misunderstanding, probably underlies the fact that most antipollution action in Florida has been directed specifically at the phosphate fields.

Last week, for example, Florida's Air Pollution Control Commission was on the way to getting more muscle, as the state senate passed an air pollution control law—although it narrowed down to affect only the phosphate industry in Polk County and eastern Hillsborough.

The measure also added representatives of cattlemen and citrus growers to the commission. The latter group last week was preparing a suit reportedly seeking awards for damage by alleged air pollution stemming from the phosphate operations. Seven producers are already under fire from the cattlegrowers, are financing a joint research study to determine the bases

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SPECIFICATION	WHITE OLEINES		RED OILS			
	GROCO 6 USP	GROCO 5L Low Linoleic	GROCO 2	GROCO 4	GROCO 8	GROCO 18
Titre	2° - 5°C.	2° - 5°C.	3°C. max.	4° - 6°C.	8° - 10°C.	18° - 20°C.
Titre	36° - 41°F.	36° - 41°F.	37.4°F. max.	39.2° - 42.8°F.	46.4° - 50.0°F.	64.4° - 68°F.
Color 5 1/4" * Lovibond Red	1 max.	1 max.	1 max.	1 max.	1 max.	2 max.
Color 5 1/4" * Lovibond Yellow	8 max.	8 max.	10 max.	10 max.	10 max.	15 max.
Color Gardner 1933	2 max.	2 max.	-	-	-	-
Unsaponifiable	1.0% max.	1.0% max.	1.5% max.	1.5% max.	1.5% max.	1.5% max.
Saponification Value	199 - 204	201 - 206	198 - 203	198 - 203	198 - 203	204 max.
Acid Value	198 - 203	200 - 205	197 - 202	197 - 202	197 - 202	203 max.
% F.F.A. as Oleic Acid	99.5 min.	99.5 min.	99 min.	99 min.	99 min.	99 min.
Iodine Value (WIJS)	95 max.	90 max.	95 max.	94 max.	92 max.	85 max.
Refractive Index 50°C. (Average)	1.4500	-	1.4505	1.4500	1.4495	1.4485
Total Polyunsaturated Fatty Acids	-	3.5% max.	-	-	-	-
COMPONENT FATTY ACIDS						
C14 Myristic	5%	6%	5%	5%	5%	5%
C16 Palmitic	3%	2%	4%	5%	6%	10%
C18 Stearic	1%	-	1%	1%	2%	4%
C18 Oleic	82%	89%	80%	79%	77%	72%
C18 Linoleic	8%	2.5%	9%	9%	9%	8%
C18 Linolenic	1 %	0.5%	1%	1%	1%	1%
MACKAY TEST:						
Time to reach 105°C.	over 7 hrs.	over 7 hrs.	over 4 hrs.	over 4 hrs.	over 4 hrs.	over 3 hrs.

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ADMINISTRATION

of air pollution complaints. The study, nearing the end of the first year of its three-year course, has apparently yielded no findings not available to other producers or the state board of health.

New Spevack Round

In what appears to be the first real precedent-setting move in the two-year-old Spevack heavy-water-process litigation, a federal district court unquestionably has stamped "private property" on the improved process for making heavy water. It also gives the Dept. of the Army a green light to proceed with conversion of the Atomic Energy Commission's Dana heavy-water plant.

For Jerome Spevack, New Rochelle, N. Y., inventor of the improved process, the recent court order is significant in that it clearly establishes — by its restrictions on government use of the process until a pending patent issues later this summer — Spevack's ownership of and exclusive right to the improved process.

Although a U.S. Supreme Court decision earlier this year left in effect a temporary injunction blocking Atomic Energy Commission disclosure of Spevack's process until the patent issues, and wiped from the record all previous proceedings in the case, observers were divided on the precedent-setting significance of the ruling (*CW*, April 4, p. 92).

The recent ruling apparently takes an important step toward establishing ground rules for future relationships between the federal government and private scientists and inventors whose inventions are used by the government.

Restricts Government Use: Spevack had moved for a clarification ruling soon after the high court decision earlier this year. That it came through quickly also might have been due to the fact that the Dept. of the Army also wanted the matter clarified. (The ruling was signed by Federal Judge Alexander Hottzoff, Washington, D. C.) The Army, its bidders, contractors and subcontractors are currently studying the Dana heavy-water plant (Newport, Ind.) for the purpose of converting it to other uses (*CW*, June 13, p. 40).

Restraints placed on the govern-



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4-Chloro-2-aminotoluene

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ADMINISTRATION

ment use of Spevack's improved process, however, clearly indicate that the court considers the process and pertinent data the exclusive property of Spevack.

LABOR

Dye Contract: More than 500 members of the International Chemical Workers Union have negotiated a 15¢/hour wage increase with the Dyestuff and Chemical Division of General Aniline & Film Corp. at Rensselaer, N.Y. They'll get 8¢/hour more this year and 7¢/hour additional next year, under terms of a two-year contract with Local 227.

Committee Definition: The U.S. Supreme Court last week unanimously ruled that "employee committees" established by two Texas carbon black firms operated by the same management are labor organizations under the Taft-Hartley Act. Cabot Carbon Co. and Cabot Shops, Inc., established and supported the committees at their plants to discuss problems of mutual interest, including grievances. The court, in upholding the National Labor Relations Board, ruled the companies must disband the committees. The board had upheld unfair labor charges filed against the companies by the International Chemical Workers Union.

Rubber Talks: In the prolonged negotiations between the United Rubber Workers Union and the major rubber producers, the strike by 18,000 employees of Firestone Tire & Rubber Co. and 14,000 B. F. Goodrich Co. employees set a new record for duration of rubber industry strikes last week by moving into its seventh week. The strike began April 15. Goodrich, however, reached settlement the following day with signing of a two-year master contract and a five-year welfare agreement, similar to those reached with other rubber producers. Meanwhile, the URW executive board completed a policy committee agenda in Chicago, setting out goals for wage negotiations due to come up this summer.

Dow Settlement: Dow Chemical Co.'s Texas Division and the Ethyl-Dow Corp., a joint venture between Dow and Ethyl Corp., have reached agreement with 10 unions for a 5¢/hour across-the-board increase effective retroactively to June 1. The agreement extends for one year from that date. Negotiating committees headed by leaders of Local 564 of the Operating Engineers and the Freeport Metal Trades Council represented the unions.

Labor Practice: The National Labor Relations Board has issued an order to Hercules Powder Co. to stop unfair labor practices at its Bessemer, Ala., plant. Trial Examiner David London said the company wrongly laid off and reduced the workload of workers in June '58, ruled the firm had threatened its employees with shutdown during negotiations.

KEY CHANGES

Richard E. Speaker to director, Arkansas-Louisiana Chemical Corp. (Pine Bluff, Ark.), subsidiary of Arkansas-Louisiana Gas Co.

Charles E. La Roche to director, Purex Corp. Ltd. (South Gate, Calif.).

Thomas H. Jukes to vice-president in charge of research, Nutrilite Products (Buena Park, Calif.).

John W. Trimble to vice-president for sales branch operations, Delano W. Ladd to vice-president for Eastern regional sales, W. W. Boeschenstein and R. E. Brown to regional vice-presidents, Owens-Corning Fiberglas Corp. (New York).

James Fry Mersereau to vice-president, Arthur G. McKee & Co. (Cleveland).

William F. Mitchell to vice-president, General Mills (Minneapolis).

William M. Halle to vice-president, Union Carbide Corp.; **William B. Nicholson** to president, Linde Co., division.

Maurycey Bloch to president, newly formed Western Petrochemical Corp. (New York).

DIED

Leo Hart Harvey, 60, president, Dixie Chemical Co. (New Bern, N.C.), at Kinston, N.C.

R. Barnwell Fuller, 67, former assistant vice-president, International Minerals & Chemical Corp., at Lakeland, Fla.

Tracers

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Chief Chemist—Rapidly growing heavy chemical manufacturer in North Jersey has an opening for a Chief Chemist preferably with sulfuric acid experience. Advancement opportunities available. All replies confidential. P-1896, Chemical Week.

Chemical Sales—An attractive future with prominent organic chemical manufacturer for young men with chemical degree. Selling experience within the Chemical Industry preferred. Openings in many metropolitan areas. Applicants are invited to write to Sales Manager: Geigy Industrial Chemicals, P.O. Box 430, Yonkers, New York.

Sales—The Atlantic Refining Company is looking for a recent graduate in Chemical engineering or chemistry for training in petro-chemical market research and commercial development. Applicants must be interested and capable of eventually moving into a selling job, and willing to travel and relocate. Unusual opportunity to grow with an expanding market. Phila. location to start. Reply in confidence including all details of education, experience, salary history and willingness to relocate to Sales Personnel Division, Box 12, Phila. 1, Pa.

SELLING OPPORTUNITY OFFERED

Resin Salesman Wanted—New York Area. Great opportunity for aggressive individual to associate with rapidly expanding national company. Will handle full line of synthetic resins. Must have knowledge of paint formulation. Excellent job for the right man. Submit complete resume. SW-1940, Chemical Week.

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Mkt. Development-Research, B.S. CHE 1953; MBA '59 seeks position in chemical commercial development, market research, sales. PW-1806, Chemical Week.

Sales/Mkt. Development—13 years Sales, Mkt. Development and Research in food, drug, cosmetic, chem. specialties and related industries. Interested position utilizing this background. PW-1919, Chemical Week.

MANAGEMENT SERVICES

Clark Microanalytical Laboratory—CH. N. S. Halogen, Fluorine, Oxygen, Alkoxyl, Alkoxide, Acetyl, Terminal Methyl, etc. by specialist in organic microchemical analysis. P.O. Box 17, Urbana, Ill. Empire 7-8406.

CHEMICALS WANTED

Acids Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Plastics, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N.Y. HAnover 2-6970.

FOR SALE

\$3,000,000 **Liquidation-Chemical Plant** at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers, Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

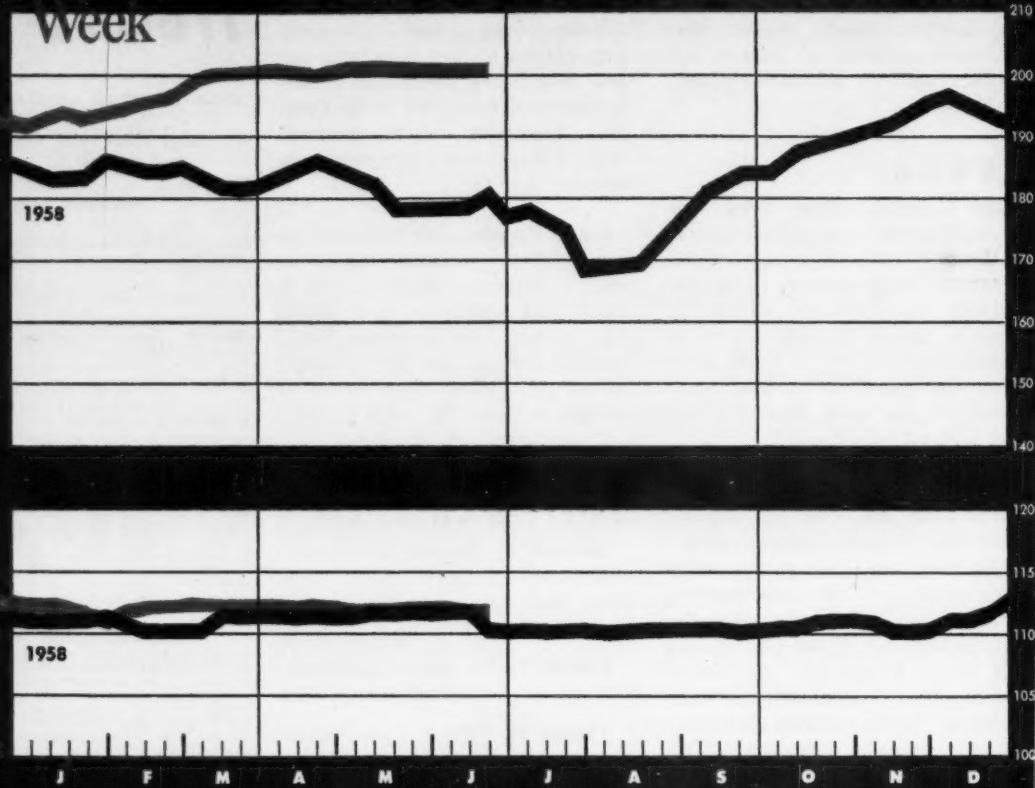
For Sale: Number of coated tanks, pumps, boilers, etc. FS-1864, Chemical Week.

Brekelite BR-9432 Resin (Phenol-Formaldehyde) \$3.33/lb. (Orig. Blis.), Carbon Tetrachloride—Redist. & Destilled \$7.50/lb. (Bulk). TCA—off color 5 drums \$26/lb. DOA, Virgin, Off Color 10 drums \$35/lb. Barium Hydrox. N.F. (J. T. Baker Orig.) 15 Ibs. each \$0.06/lb. DBM, Virgin, Off Color 30 drums \$15/lb. Wash Acetone, 100% Ketone w/w and dry \$0.07/lb. (B-lk). Lacquer Thinner, Off Color \$25/gal. (Bulk). FS-1898, Chemical Week.

WANTED

Wanted: Used Polarimeter-Lippich type—accuracy 0.02 angular degree—Give name of manufacturer and year of manufacture. W-1932, Chemical Week.

BUSINESS BENCHMARKS



JUNE 20, 1959

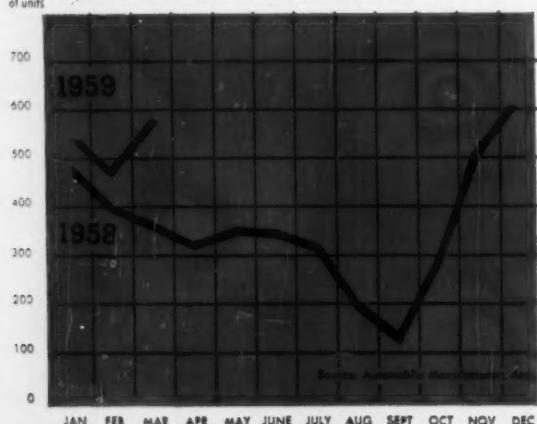
WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-1949=100)	201.5	201.3	176.5
Chemical Week wholesale price index (1947=100)	111.9	111.9	110.7
Stock price index (11 firms, Standard & Poor's)	56.93	58.46	39.46
Steel ingot output (thousand tons)	2,681	2,653	1,728
Electric power (million kilowatt-hours)	13,023	12,778	11,681
Crude oil and condensate (daily av., thousand bbls.)	7,032	7,203	6,256

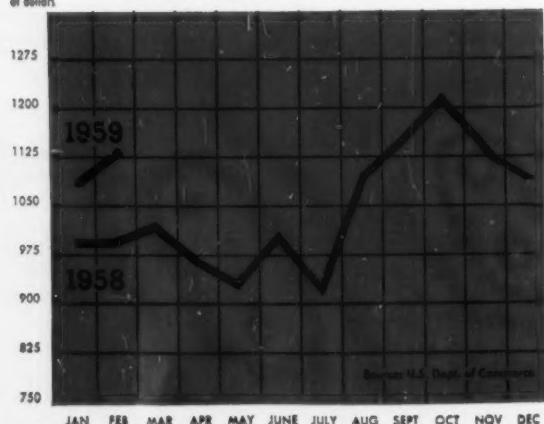
MONTHLY INDICATORS—**Trade (million dollars)**

	Manufacturers' Inventories			Manufacturers' Sales		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All manufacturing	30,232	29,106	24,945	50,852	50,323	51,486
Chemicals and allied products	2,083	1,979	1,832	3,763	3,742	3,839
Petroleum and coal products	3,059	3,046	2,594	3,312	3,286	3,441
Paper and allied products	1,036	988	874	1,479	1,462	1,468
Textile products	1,241	1,200	1,016	2,457	2,451	2,606

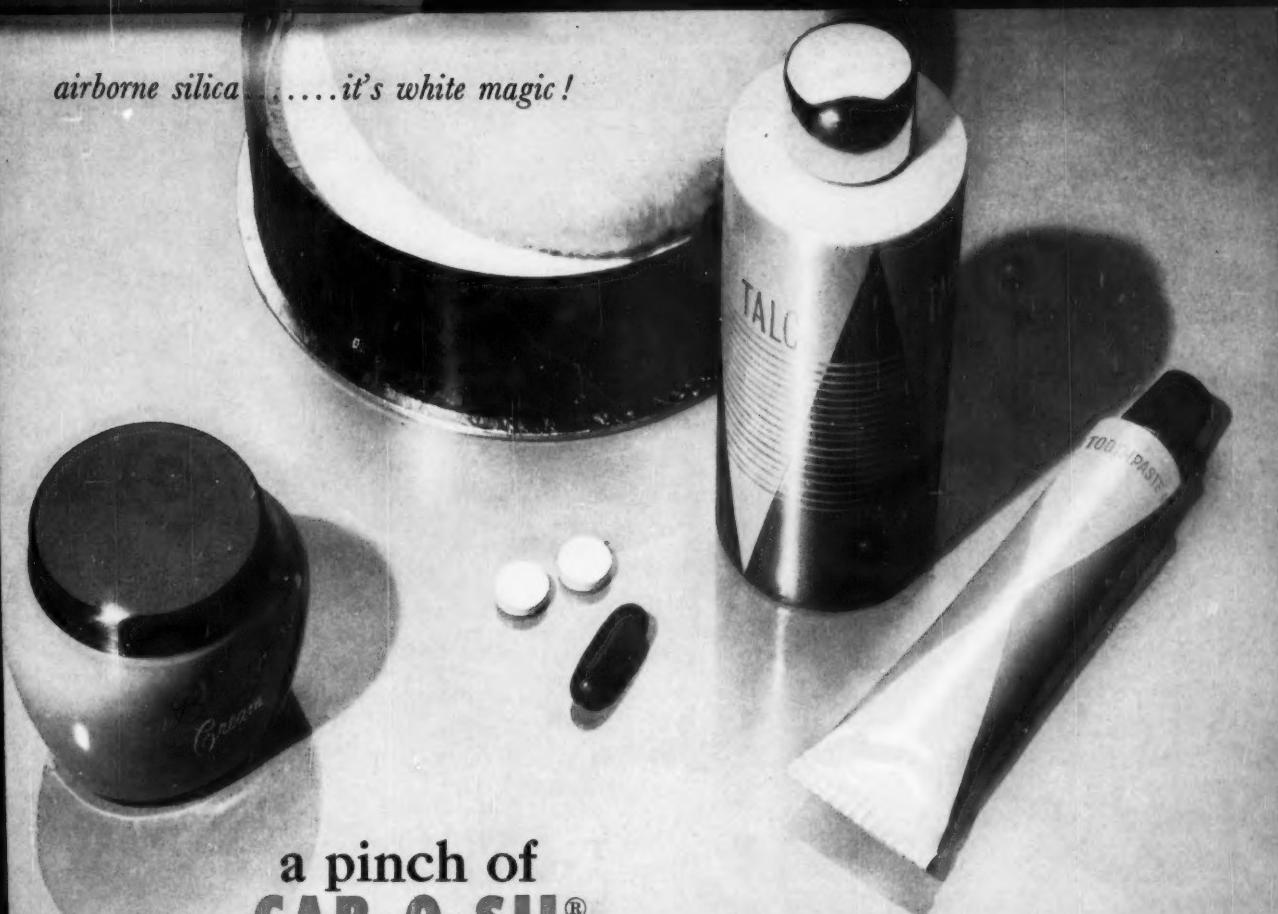
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- Flattening agent — varnishes, lacquers, organosols, plastisols
- Reinforcing agent — rubber, silicone, latex film
- Anticaking agent — sulfur, insecticides
- Antislip agent — solvent-base floor waxes
- Precoating material — reproduction paper
- Low temperature thermal insulation
- Pharmaceuticals and cosmetics — (See Bulletin #cpha-1)

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